Implementing evidence-based obstetrics in a middle-income setting: A qualitative study of the change process

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy by

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Inspirations

...that restored my sanity in times of crisis:

'If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties.'

Francis Bacon

'Experience is not what happens to a man; it is what a man does with what happens to him.'

Aldous Huxley, 1932

'Only those who attempt the absurd will achieve the impossible.'

Albert Einstein

'Not all change is improvement, but all improvement is change'

Donald Berwick, 1993

'A change is a slow flux, which must happen bit-by-bit. And it must *happen*. You cannot drive it like a steam engine. But all the time you can be alert and intelligent about it, watch for the next step, and watch for the direction of the main trend.'

DH Lawrence, 1930

'It is well known that when you do anything, unless you understand its actual circumstances, its nature and its relations to other things, you will not know the laws governing it, or know how to do it, or be able to do it well.'

Mao Tse Tung, 1936

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Glossary

Better Births Initiative	A package containing the educational workshop and materials, and other components of the change programme used in this study. After this research showed impact on provider behaviour in one province, the Initiative was rolled out to other provinces in South Africa.
Change programme	The multi-faceted change intervention used in this study to influence obstetric practice.
Complexity theory	A new paradigm that rejects the assumptions of classical science – reductionism, objective observation, and linear causation – and acknowledges unpredictability and non-linearity.
Critical factors	Factors (internal or external to the study) that might influence diffusion of knowledge into changed behaviour.
Good practice	Practice that is compatible with evidence-based standards.
High-income country	A country earning $9,206 or more per capita, based on World Bank classification using Gross National Income (GNI) per capita[i].
Low-income country	A country earning $745 or less per capita, based on World Bank classification using GNI per capita.
Marker practices	Practices audited using exit interviews to obtain an estimate of change in clinical practice. Selected because of the clear evidence, from systematic reviews, of benefit or harm.
Middle-income country	A country earning $746-$2,975 GNI per capita (lower middle-income) or $2,976-$9,205 GNI per capita (upper middle-income). Based on World bank classification.
Organic approach	An approach to change characterised by minimal control, and belief that small incremental events yield successful adjustment.
Planned approach	An approach to change that comprises a series of planned steps or phases; a highly controlled process that aims for predictable outcomes.
Primary analysis	Open coding of transcripts, identifying themes, developing a thematic framework, applying a coding index to all transcripts and developing matrices to aid interpretation of data.
Programme attributes	Innovative elements of the change programme, including facilitation, content, mode of delivery and organisational approach. All of which could influence behaviour change.

[i] The World Bank Group. Data and Statistics: country classification. http://www.worldbank.org/data/countryclass.htm. Accessed 26 November 2002.

Secondary analysis	Triangulation of quantitative data that classified study sites according to the extent of provider behaviour change, with narrative findings about how change was implemented at each hospital, to explore the dimensions of change.

Abstract

Background

Ensuring health professionals practice according to evidence-based standards is important since it affects the quality and cost of care patients receive. Despite the availability of rigorous evidence of effectiveness, clinicians are often reluctant to change the way they practice; the gap between research findings and practice in obstetric care is particularly wide. Many interventions and strategies to help change health professional behaviour have been tested, but knowledge of how and why change occurs remains elementary. The purpose of this research was to use a focused change programme to determine the influence of critical factors and key attributes on the diffusion of knowledge into changed health provider behaviour in a middle-income setting.

Methods

The study was conducted at ten purposefully selected government maternity units in Gauteng province, South Africa. A single educational workshop was conducted with labour ward staff at each study site. Workshops comprised a variety of interactive materials, some in traditional printed format. A local opinion leader acted as workshop facilitator, and used a series of exercises with participants to examine their current obstetric practice and identify ways to make changes.

The study used a single group pre-post test design; pre-test observations were made at all ten sites, the educational workshop was delivered to all sites, and post-test observations made at approximately 6 months. Five (intervention) sites were randomly allocated to receive a self-audit mechanism to help staff monitor changes to their practice. Exit interviews with postnatal women were used at baseline and follow-up to document rates of use for seven marker practices; focus group discussions with labour ward staff prompted discussion around how practice changes had been implemented and experiences of the change programme; individual experiences of the change programme, and barriers to implementing change were explored using in-depth interviews with key labour ward staff at each site. Quantitative data were processed and analysed using Epi Info and Stats Direct. Qualitative data were analysed manually using principles of grounded theory and the framework approach; coding was managed using WinMax analysis software. Outcomes included change in provider behaviour for the marker practices, understanding the influence of change programme attributes on decisions to change, and the critical factors that influence diffusion of knowledge into changed health provider behaviour.

Results

Workshops were conducted at nine out of the ten study sites. 247 exit interviews were conducted with postnatal women at baseline and 215 at follow-up; eight focus group discussions and 14 in-depth interviews were conducted with labour ward staff at follow-up. Qualitative findings suggest the characteristics of the change programme influenced providers' decisions to change their practice. In particular, the content of the educational workshop; the workshop materials; the way the workshop was conducted; and the information delivered helped to promote change. Baseline and follow-up data indicate change in practice in the intended direction was consistently more likely for enemas and shaving. Supine position, the use of oral fluids, and companionship during labour were less likely to have changed at follow-up. Qualitative findings reveal that behaviour change was more likely at hospitals where motivation among staff was high and social structures existed to support and maintain changes to practice.

Discussion

All exit interviews were conducted in a standard way, and the data double entered; focus group discussion and in-depth interview data were analysed using a systematic and replicable process. The results showed that behaviour change does not necessarily happen as planned in a linear sequence, but rather as a series of small events, incrementally. Those attempting to influence health professional behaviour should consider that change happens within a complex human environment dominated by non-linear relationships; it is an unpredictable process that requires and time and sustained effort. Implementation trials with short follow-up for primary outcomes are unlikely to achieve the expected impact given the complexity of the change process. Those engaged in implementation research should consider explanatory trials using qualitative methods to clarify critical success factors, before conducting larger pragmatic trials to determine the size of the effect on practice and behaviour.

Chapter 1 Introduction

'We are changing, we have got to change, and we can no more help it than leaves can help going yellow and becoming loose in autumn, or than bulbs can help shoving their little green spikes out of the ground in spring.'

DH Lawrence, 1930

1.1 Evidence based obstetric care

Change in medical practice is important since it directly influences the health of patients and the cost of their care. Change is the act of making or becoming different[1]. In the context of clinical practice, it refers not only to change in individual behaviour, but also change in management structure to support the dissemination and adoption of new knowledge and change strategies to help providers implement effective practices[2].

Systematic reviews of medical research are recognised as the most reliable and rigorous source of evidence of the effects of treatments, behavioural interventions, diagnostic tests, and ways of organising health services [3 4]. Each review attempts to answer a clearly defined clinical question, and reviewers use robust methods to search, select, appraise, and synthesise the findings of all relevant research. In contrast to traditional summary reviews, systematic reviews adhere to a strict scientific methodology that attempts to limit the effects of bias at each stage. An additional benefit is that systematic reviews are updated regularly as new evidence emerges [3 5].

Pregnancy and childbirth was one of the first medical specialities to recognise the need to summarise the research around the effects of interventions used in practice. In the 1985 the National Perinatal Epidemiology Unit in Oxford, UK established a database of more than 3,000 randomised controlled trials conducted between 1940 and 1984. This resource made it possible to conduct systematic reviews of the evidence on particular interventions, and the seminal publication 'Effective Care in Pregnancy and Childbirth' contained many of these reviews[6]. The Cochrane Pregnancy and Childbirth group was established in the early 1990's, and has since contributed over 250 reviews to the Cochrane Library[7].

Evidence based medicine requires integrating clinical expertise with the best available evidence from robust research[8]. However, clinicians are often reluctant to change the way they practice, even when rigorous evidence of effectiveness exists[9 10]. Disparities between clinical practice and research evidence are well documented, and this is nowhere better illustrated than in obstetric care. For decades practices with unknown effectiveness have been used, and those that potentially cause harm to women and their infants continue to be used in many settings[11]. For example, systematic reviews have shown that magnesium sulphate is a cheap, effective intervention for treating eclampsia[12 13 14], a serious life threatening condition in pregnant women, but practitioner beliefs and behaviour favour inferior treatments[15]. Similarly, research synthesis confirmed the benefit of steroids in pre-term delivery for preventing neonatal respiratory distress syndrome[16], yet clinicians were slow to act on this information and it took two decades to become routine practice[17]. Routine episiotomy is another example of the continued use of an unnecessary practice. There is clear evidence that restrictive episiotomy policies have a number of benefits over routine policies[18], but episiotomy continues to be practised routinely in many low and middle-income settings[19 20]. Achieving clinical behaviour change is a central tenet of evidence-based medicine; but the often-quoted 'gap' between research evidence and clinical practice remains wide. The objective 'facts' of medical research remain in the research or academic setting often beyond the reach of clinicians[21].

Numerous strategies to apply research findings in practice have been tried and tested with varying degrees of success. This thesis describes a multifaceted change programme that attempts to influence obstetric practice in a middle-income setting. This chapter justifies the need for this research; in particular the importance of changing health professional practice, the inadequacy of planned or mechanical approaches to change, and the potential role of social and behavioural theories applied to changing health professional behaviour.

1.2 Changing health professional behaviour

There are examples in the literature of attempts to collate interventions to promote implementation of research findings and classify them by theoretical basis[9 22 23 24 25]. Interventions to change health professional behaviour typically draw on theories of social psychology and behavioural science, since they are concerned with understanding and influencing individuals' attitude and ability to change. Organisational change and management theory is useful for conceptualising overall approaches to implementation and change. Grol provides a coherent classification of interventions to change clinical practice, grouped by underlying theory; an adapted version is detailed in Table 1.1.

Table 1.1 Approaches to changing clinician behaviour

Focus	Theory	Interventions
Behaviour	Learning theory Transtheoretical model	Audit and feedback Reminder systems Incentives, sanctions Printed educational materials
Social interaction	Social learning Diffusion of innovation Social influence	Opinion leaders Outreach visits Workshops Patient mediated interventions
Organisational	Management, planned organisational change theories	Total quality management, continuous quality improvement Team building Leadership models

Adapted from: Grol[22]

The Cochrane Effective Practice and Organisation of Care (EPOC) group[26] has done much to advance the evidence-base of interventions to improve health professional practice. As early as 1995 members of the (then) Cochrane Effective Professional Practice group surmised that there are:

> 'no magic bullets for improving the quality of health care, but there are a range of interventions available, that if used appropriately, could lead to important improvements in professional practice and patient outcomes[27]'.

Existing systematic reviews of interventions to change health professional behaviour show that conventional educational activities (that draw on behavioural theories) such as didactic educational lectures[28] and dissemination of printed educational materials[29] (guidelines, recommendations) have little impact on health professional behaviour[30]. Conversely, multi-faceted interventions that use a combination of audit and feedback, reminders, local consensus processes, and interactive educational meetings that include discussion and participation are consistently effective in promoting behaviour change among health professionals[30]. A major limitation across all of these reviews however, is generalisability of the findings; one overview of systematic reviews of interventions to promote change in behaviour stated that most studies were conducted in North America and Europe thus the relevance and applicability to low and middle income settings remains uncertain[30].

Strategies for implementing change

While individual beliefs, attitudes and knowledge are important influences on individual behaviour, it is important to recognise that interventions aimed at changing behaviour that lack clear implementation strategies are less likely to bring about change in clinical practice[31]. In view of the likely increased effectiveness of multi-faceted strategies, several authors have proposed conceptual frameworks or models for implementing change that draw on behavioural, social and organisational theory. The models differ in their approach; some use established management and organisational change approaches, for instance Spiegal uses a team approach[32], Hearnshaw and others have used quality improvement programmes based on total quality management and continuous quality improvement [33 34]and others focus on a more straightforward series of planned steps towards change[22 35 36]. Other models focus on identifying barriers to change and use interventions based on social and behavioural theories to implement change[25 37 38].

Although these models attempt to describe the implementation process in detail and use varying interventions to influence change, some argue that they tend to be one dimensional, linear and logical, therefore failing to capture the complexity of the change process[39 40]. Kitson suggests that context (the environment in which the change is implemented) and facilitation (the support required to help people change) are key dimensions of change that have been overlooked in other frameworks[39].

New thinking in the change management literature emphasises the importance of context (why and when the process should occur), process (how change will happen) and content (what change will occur)[41 42]. Management theorists have addressed these issues by advocating for strategies that reject linearity and emphasise the role of individual participation in behaviour change programmes (organic approaches)[43]. More recently, the application of complexity theory to health care settings has emphasised the importance of visualising health care settings as complex adaptive systems, experimenting with multiple approaches and discovering what works best[44]. Complexity in health care is emerging as a concept, but the assumptions differ greatly to those of traditional management theory: interactions between agents within a system are important determinants of change; small, unplanned events can produce large effects within a system; and uncertainty and unpredictability prevail[45]. Change strategies that employ action research cycles and organisational learning are becoming increasingly popular in health research, but their effectiveness remains unclear.

Design and evaluation of implementation research

Despite the progress in assessing the effectiveness of different interventions and strategies for change, our knowledge of how and why change occurs remains elementary. Further validation of the effectiveness and efficiency of different strategies is required; for instance little is known about what elements of change strategies work and why, as Grol states,

> 'Although we know that multifaceted strategies combining different actions and measures linked to specific obstacles to change are usually more successful than single interventions, we know little about which components of such complex interventions are effective in different target groups. So, while there is some general knowledge, there is little understanding of the 'black box' of change.[46]'

Keirse also maintains that while clinical practice changes all the time:

> '...the momentum of change, and what drives it, are poorly understood...and for those who want to have a significant impact on it, the methods for achieving it are still far from clear'[47].

Grol argues that if the processes determining change are to be fully understood, research efforts in evidence-based medicine should be complemented by research into how to implement evidence in normal practice[22]. With rigorous evidence already available from systematic reviews, new studies evaluating single interventions to change clinician behaviour provide little new information. Well-designed cluster randomised trials that evaluate two or more interventions hold more potential for furthering current knowledge of which combinations of interventions are most effective.

The search for appropriate methodology to evaluate implementation strategies is ongoing; but it is likely that randomised designs will not be sufficient to determine critical factors that influence change improvement strategies; qualitative research is more appropriate for exploring process and interactions that determine change and could help to delineate why some change programmes are successful, and why some fail. As Grol stated recently,

> 'Studying the effects of specific strategies in controlled trials will provide some answers to some questions about effective change, but will not address some of the basic questions about the critical success factors in change processes. They need to be complemented by observational and qualitative studies.'[46]

A phased approach is one method proposed for the evaluation of complex interventions[48], and observational studies of change processes and in-depth qualitative studies of how the attributes of change programmes affect their success are also expected to feature strongly in future quality improvement research[46].

1.3 Research problem

This research focuses on the 'black box' that represents current understanding of the character and effectiveness of strategies to implement change in health care. While there have been many attempts to change health professional behaviour and clinical practice using various strategies, it remains unclear which components of multi-faceted strategies help to initiate change in health professional practice. In particular the role of context and the social interactions within it, and individual knowledge, attitude and behaviour and how these relate to intention to change remains unclear. Which organisational approach to use and how best to evaluate multi-faceted strategies are also questions that remain unanswered. Therefore the core research problem of this thesis is:

Using a multifaceted change programme, what factors determine change in health professional behaviour, and what influence do they have on decisions to change?

Statement of objectives

The following objectives were developed to address the above research problem:

1. To design a multifaceted change programme to influence midwifery practice in a middle-income setting.
2. To explore the influence of the attributes of the change programme on decisions to change practice.
3. To evaluate the impact of the change programme on provider behaviour.
4. To explore and understand the critical factors that influence diffusion of knowledge into changed health provider behaviour.

Chapter four provides further information on the purpose of the study, and outlines specific research questions.

1.4 Thesis outline

Chapter 2 provides a summary of the literature around different approaches and theories of change. It introduces traditional management and organisational approaches and contrasts planned models of change with organic (or less mechanistic) models. The literature review also discusses the relevance of complexity theory and social and behavioural theories applied to changing health professional behaviour.

Chapter 3 outlines the development of a multifaceted change programme, the main intervention used in this research. The chapter describes exploratory studies conducted in several low and middle-income settings to document differences between actual practice and the best evidence. These findings helped to identify gaps between what is currently known and what is practised. The results were used to inform the content of the change programme; the characteristics of the intervention are described in detail in this chapter.

Chapter 4 presents the conceptual framework underlying the research, the objectives, research questions and methods.

The results of the research are presented in chapters 5, 6 and 7. The results are presented in terms of: the influence of the attributes of the change programme on decisions to change (chapter 5); impact of the change programme on provider behaviour (chapter 6); and an exploration of the critical factors that influence change (chapter 7).

Chapter 8 discusses the international relevance of the research, its contribution to the development of theory and practice, and wider implications for policy makers promoting evidence-based practice in low and middle-income settings.

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Chapter 2 Literature review

2.1 Introduction

This chapter explores different approaches to implementing change in health professional behaviour by summarising the literature around common change theories. Relevant approaches and theories from the management and organisational change literature are taken as a starting point, since some strategies for change in health care organisations and frameworks for implementing change in health professional behaviour clearly draw on approaches that have been tried and tested in organisational settings. Annex 1 provides further explanation of the rationale for the areas of literature searched, and the search process.

The first part of this chapter describes management and organisational change approaches and contrasts planned and organic change models applied to health care. The second part considers the role of behavioural and social theories in understanding individual and social processes that influence health professional behaviour. The final part reflects on the potential contribution of complexity theory to an overall understanding of how change in clinical practice is initiated and institutionalised.

Throughout the literature review, the ideas of key authors and their theoretical perspectives are introduced chronologically; and examples of how these have been applied to change in health services and health professional behaviour are provided. The search methods, including databases searched, search terms and dates of literature searches are documented in Annex 1.

2.2 Organisational change theory

Organisation theory is concerned with how organisations function and how they should be managed. Writers on organisation theory attempt to delineate general rules that can be applied to help organisations grow and develop, and avoid contraction and decay. Although business managers and strategists largely dominate the field, sociologists, social psychologists and economists make a valuable contribution to the analysis of organisations[1 2].

Organisational theory considers factors that need to be addressed when attempting change: understanding how innovation is fostered, what motivates individual workers, and the influence of power structures and change agents[1]. Change theorists believe these factors can be effectively managed to bring about change. However, increasing recognition of the influence of history, process and context on organisational change has prompted a shift from planned linear approaches to organic strategies that are more flexible and incremental in their approach to managing change. This section outlines organisational change theories in chronological order, beginning with traditional planned models of change including the three-stage model and organisational development theories; and organic models are also presented and compared to linear, planned approaches. This section then contrasts planned and organic approaches applied to change strategies in health care.

Planned approaches to change

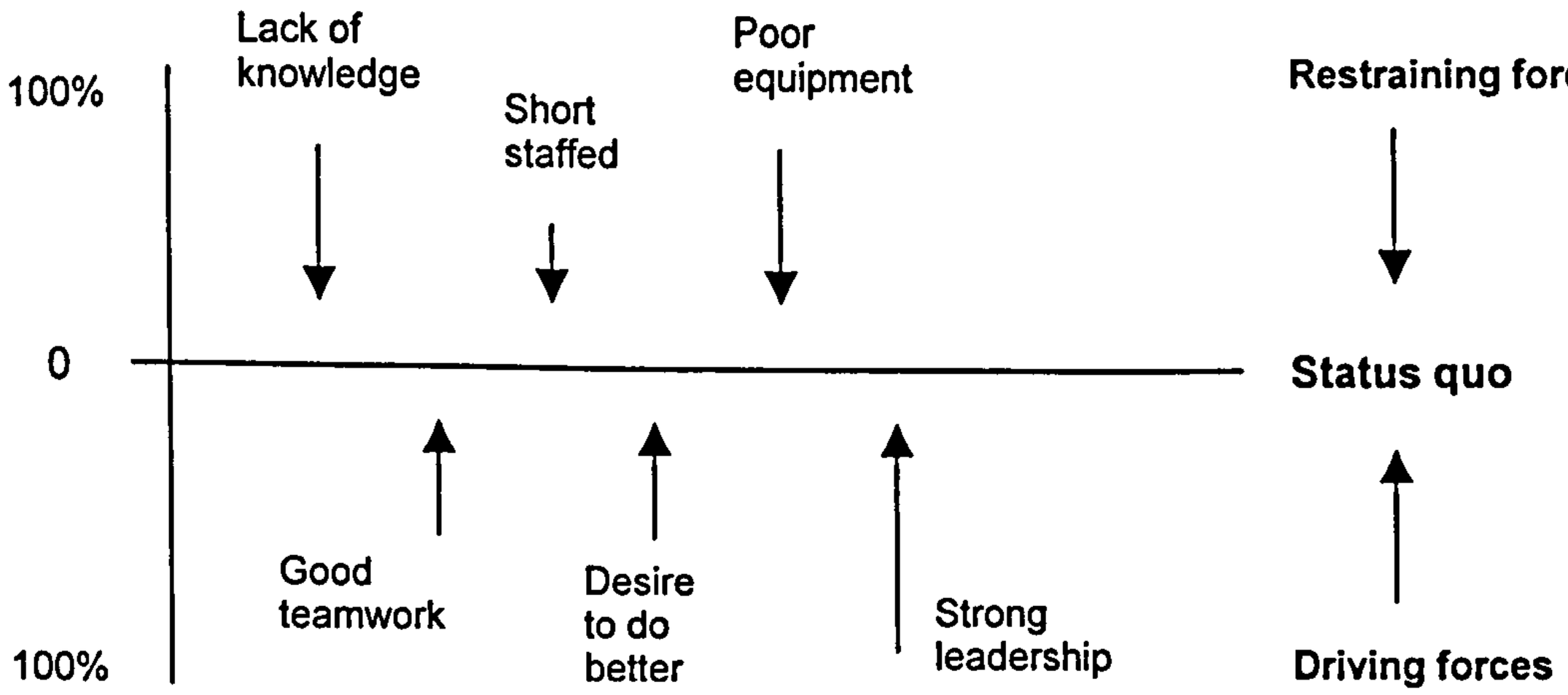
The three-stage model of change

Kurt Lewin, a respected psychologist and pioneer of planned change theory, proposed the now classic three-phase model of change in the late 1940's[3]. Lewin's model envisages organisational change as a process of unfreezing existing behaviour, applying change, and re-freezing new behaviour; the three phases facilitating transition from a current state to a more desirable future state. 'Unfreezing' is akin to preparing a situation for change; it helps people to break old habits and recognize alternative ways of doing things. 'Changing' is when something new takes place and change is implemented. The final stage 're-freezing' involves stabilising the change and ensuring its continuity[4].

Lewin defined a law of the nature of group life and change that underpinned his three-phase model. The law specified that change (Ch) is the difference between a preceding situation (S) and a following situation, which emerges out of the first as a result of some influence ($Ch = S_{after} - S_{before}$). He suggested that scientists should study three processes to explore social change: a) the character of the beginning situation, b) the happenings designed to bring about change, and c) the end situation. Lewin proposed that the study of the before and after situation allows an assessment of the effect of the change, and studying the actual happening enables one to characterise the factors which brought about the change. In-depth study of these components is key to understanding the way people change their behaviour – yet social scientists still strive to accomplish this with sufficient rigour, and change efforts are still evaluated using predominantly quantitative methods.

Another key component of the three-phase model is force field analysis; the supposition that all organisations exist in equilibrium with driving forces competing with restraining forces[3 5]. For change to occur there must be a strengthening of the forces that drive the change or a weakening of the forces that restrain it. Force field analysis is a useful technique for understanding a proposed change; determining what the barriers to change might be and what factors might drive the change. Management consultants still advocate this method as a useful process to work through with small groups who understand the issue requiring change. For example, Plant suggests that because resistance to change is emotionally rooted, and therefore not a rational process, the sources of resistance need to be explored. He proposes force field analysis as a way of diagnosing resistance, and to provide insight into the steps to be taken to overcome resistance[6]. The most common visualisation of force field theory is a 'force field map' or diagram, in which the horizontal line represents the status quo (or quasi-equilibrium); downward pointing arrows show resisting forces and driving forces are represented by upward pointing arrows. The diagrams typically include a scale that assesses the relative importance or strength of each force; figure 2.1 illustrates a typical force field map.

Figure 2.1 Force field map



Adapted from: Plant[6] and Hussey[7]

The simplicity of Lewin's three-stage model and its straightforward approach to planning change is one reason why it has survived and continues to inform change programmes even now. However, the main criticism of Lewin's model is its attempt to apply a 'child's' formula to what is essentially a more unpredictable and complex situation[8]. As Bullock and Batten acknowledge, the three phases are simple to state yet not as simple to implement[9]. The model deals with change as an independent stage (or event), separate to unfreezing and re-freezing, which fails to acknowledge the process of implementing change. Linear change while a useful concept, masks the complex interactions that propel change forward often with one stage overlapping another. Additionally, the staged model appears rigid, with no recognition that people (and organisations) are changeable elements, rarely static long enough to 'freeze', let alone re-freeze.

Organisational development theories

Organisational change theorists continued to build on Lewin's three-phase model. During the 1960's and 70's, proponents of organisational development (OD) used theoretical models of change, most of which were based on stages or phases of change.

Organisational development is an approach to planned organisational change that focuses on systematic and long-range efforts to improve effectiveness[4]. The process of organisational development typically involves establishing a working relationship between change facilitator and clients (those working towards change), diagnosis of the problem or situation to be changed, an active intervention, evaluation, and establishing a terminal relationship with the client[4].

In the 1950's Lippitt, Watson and Westley presented a planning model based on the following key phases: develop a need for change, clarify the problem, examine alternatives, implement change effort, stabilise the change, and terminate the relationship[10]. Throughout the 1960's theorists developed variations of this model, many advocating for the inclusion of data collection and feedback as essential components of planned change. For example, Schein described the stages as initial contact, work planning, data gathering and diagnosis, intervention, reducing involvement, and termination[11], and Lawrence and Lorsch described similar stages of diagnosis, action-planning, implementation and evaluation[12]. Beckhard and Harris[13] proposed a three-part transition model that included the present state, a transition state and a future state. In all these models, there is an emphasis on control by the change interventionist (or facilitator) – diagnosing a problem, implementing a change, and terminating the relationship with those involved in the change. Contribution and input from participants in the change process is absent. A common weakness inherent in these theories is the failure to provide practice parallels; thus perpetuating the argument that theories of planned change are useful for conceptualising the change process, and have superficial appeal, but are not easily implemented in practice. As with the earlier models of change, these OD models tend to overlook implementation as a process, and rather deal with it as an independent event (i.e. implement a change effort) that can be easily executed.

Throughout the 1980's organisational change theory continued to draw on what were essentially the ingredients of the three-phase model, and a mechanistic approach to change. In 1983 Kanter[14] described a process of: a) departure from tradition, b) strategic decisions and prime movers, and c) action including vehicles for change and institutionalisation. Tichy and Devanna introduced the three-act drama in 1986; this included awakening (act 1), mobilising (act 2) and reinforcing (act 3) [15]. Other writers who advocated three-phase models included Beer[16] and Nadler and Tushman[17]. In 1985 Bullock and Batten, frustrated at the inconsistent use of phases and stages in theoretical models of change, attempted to define an optimal approach to organisational development[18]. They argued the need for a general, activity based phase model that uses linear, fluid phases, that views change as longitudinal and continuous, and that applies to specific case studies. They developed a four-phase model that distinguishes between change phases, which are linear and irreversible 'states', and change processes - the mechanisms used to move an organisation from one state to another. While this standard approach to planning and executing change in organisations can contribute a basis for testing and evaluating change theory in practice, it remains rigidly linear in its approach, suggesting that change phases are irreversible once 'achieved'.

Creating a vision

In the early 1990's the management literature reveals criticism of models of planned change and their overtly linear nature. The alternatives proposed appeared to emphasise the importance of 'vision statements' in shaping the future state of organisations. Kanter et al suggested, 'ten commandments for executing change'[8], which specified tactics for achieving change. In 1995, Kotter presented 'eight steps to transforming your organisation'; these included stages of creating a vision, acting on the vision, and institutionalising new approaches. While fully embracing a 'visionary perspective', his view is still typical of planned change theorists - organisational change a series of phases that usually require a considerable length of time to complete[19]. Kotter emphasises the linear nature of change and warns against straying from the planned process for fear of detrimental effects on the end result, but he does acknowledge that successful change efforts are 'messy and full of surprises'.

Hussey, a contemporary management expert is another proponent of 'envisioning' and stresses the importance of leader's visions in inspiring strategic organisational change[7]. Hussey considers a 'good vision' as one that is relevant, challenging, integral, and engenders a shared understanding of the future state and the way it differs from the present. Formulating a vision, if it involves all concerned in the change process, can help foster commitment towards the change and avert resistance. However, this important groundwork establishing shared goals and commitment risks being eroded if there are no examples to follow, and individuals are unclear about the actions needed to transform vision into reality.

Planned approaches to change discourage diversion from the plan of action and can appear very prescriptive. In fact, Charles Handy likens change management to the role of a GP: identifying the symptoms (or problems in the case of the change manager), making a diagnosis (or developing a plan of action), and treating the symptoms (implementing change)[20].

Planned change approaches applied to health care services

Interventions based on planned and linear models from organisational change theory have been applied to change strategies in health care. Some studies demonstrate positive effects on practice after following planned steps towards change[21]; others highlight the limitations of a linear process[22]. This section considers the advantages and disadvantages of linear approaches to implementing change in health care.

In 1992 Spiegal et al[23] used a model for managing change that was based on a planned approach used in industry. The authors applied the model to different areas of general practice including: introducing screening services and surveillance of chronic disorders, incorporating new technology in practice administration, and improving working relationships between different professional groups. Stakeholder analysis was central to the approach, and a series of steps was used to guide implementation of the changes. The key steps are clearly planned and while the authors recommend flexibility in their use, they are presented in a logical order beginning with objective setting and developing a timeframe, ending with formal review and celebration. Implicit to this study is the belief that change is a process that if followed step by step will inevitably lead to progress and arrival at a new and more desirable state. The authors do not present findings from their study, so the reader is unable to judge whether such a planned approach was useful in managing change in general practice.

Haines and Jones proposed a conceptual framework to implement research findings that describes implementation as the outcome of a straightforward connection between research findings, continuing education and audit[24]. The strategy was developed in response to changes in management and organisation of the UK National Health Service (NHS), and is described as an integrated approach that will enable clinical practitioners to be responsive to the best available evidence. The strategy represents what could be described as a classic cause and effect (linear) model. The authors suggest that guidelines are an important element of continuing education, and that once disseminated via education programmes, clinicians will adapt and use guidelines in practice and adherence can be monitored by clinical audit. An important assumption of this framework is that adaptation and use of guidelines in practice is an uncomplicated event. The approach fails to consider the many factors (individual, social, organisational) that influence the development and implementation of guidelines, and consequent changes to behaviour. In low and middle-income settings, the process of developing and implementing guidelines for clinical practice is firstly hindered by poor communication and information sharing between policy makers and researchers. Secondly, developing guidelines that are based explicitly on the best available evidence requires skills in locating, appraising and interpreting research findings. An intensive and participatory approach to developing locally applicable guidelines is being tested in Nigeria; the approach involves state ministry level officials, hospital management representatives and practitioners, working in small teams to produce guidelines relevant to local priorities (M Meremikwu, personal communication). However, this strategy is dependent on the time and commitment of key people, and will require significant resources to scale up to national level.

An additional assumption of this strategy, which should be considered in both high and low income settings, is that individual clinician knowledge and characteristics are the reason for non-implementation of research findings in practice. Barriers to change also exist at the organisational and social level, which can influence the health care system as a whole; these need to be assessed and integrated into any strategy for encouraging evidence based practice.

In 1998 Garside[25] suggested that organisational change theory and models of change management could be applied to quality improvement in health care systems in the United Kingdom. Garside proposes that change can be both led and managed, and that successful change implementation depends on 'pedantic process steps'. The paper advocates the three-phase model of change and concludes by suggesting the NHS invests in process action plans, project plans and management skills to facilitate the transition from the current state to a desired future state. The author subscribes to the traditional mechanistic paradigm that behaviour can be controlled and managed, and is of the belief that change is a well-defined and logical process. If the paper had provided a concrete example of the application of planned change theory to improving quality in health care, the findings might have revealed a more complicated process.

To help bridge the gap between research and practice in nursing, several utilisation models have been developed, some of which are based on planned change theory[26]. The Conduct and Utilisation of Research in Nursing (CURN) project represents one of the first attempts at a model that would provide an enduring set of functions to change nursing practice, and it is based on a planned change process. The strategy comprises seven steps: 1) identification of patient care problems; 2) identification and assessment of research based knowledge; 3) adaptation and design of a practice innovation; 4) conduct of a trial and evaluation of the innovation; 5) decision to adopt, reject or modify the innovation; 6) development of means to diffuse the innovation; and 7) development of mechanisms to maintain the innovation. Key assumptions of the model include organisational commitment, resources and access to up to date information; and linear progression through the seven steps from start to finish. An evaluation of the CURN project in 34 nursing departments in Michigan, North America from 1975-81 indicated that 1 year after implementation experimental hospitals had significantly higher levels of research utilisation[27].

The applicability of such a model to other (under-resourced) settings is questionable given the assumptions. For instance, the model places a large responsibility on the individual nurse to identify areas for change and implement changes to practice; in resource poor settings where a hierarchy of practitioners is very apparent, and nurses and midwives are forced to work in a doctor-led environment, they are often powerless to suggest or implement practice changes. It might be presumptuous to expect individuals to change without higher-level organisational support. The assumption that the application of findings will happen at the individual practitioner level relies on individual nurses' readiness to locate, understand, interpret and use research findings. It is unrealistic to expect individuals, in high or low-income settings, to be equipped with these skills, and provision of training and mentoring in these skills inevitably increases the cost of implementing the model. In addition, the model represents an attempt to influence quality of care in nursing, whether the same approach would yield successful results in medical settings remains unclear.

In an attempt to bridge the gap between medical research and practice, Dawson presents lessons from industrial technology transfer[22]. She suggests that experiences of practising technology transfer in industry could provide a basis for developing links between research and practice in the health service. Initial research on technology transfer affirmed a linear sequence of steps between idea generation and implementation. Other models advocated the need for dissemination strategies, and leadership and management[28]; but these approaches still assumed a linear one-way flow of information from research to use of the findings in practice. Later research on technology transfer recognised the inadequacy of linear strategies and emphasised less mechanistic and more context specific and locally constructed processes[22]. An important lesson that Dawson outlines for health care is that simple linear models that are information driven do not adequately explain the processes involved in translating research into practice.

Organic approaches

In contrast to planned or mechanical approaches, some change theorists have acknowledged that change management is not a neat, sequential process[29 30 31], and accept that embarking on a change programme will more likely present a series of unpredictable events for which the change implementer is not prepared. Some claim change cannot be planned, and argue the legitimacy of 'muddling along' without clear direction, but learning from small events or experiments that yield successful adjustments. Such approaches, characterised by minimal control and acceptance of uncertainty, are often referred to as 'organic' models of change.

Incrementalism

James Brian Quinn, a management theorist of the late 1970's, attempted to delineate the steps managers follow to effect change and surmised that logical incrementalism was the norm[30]. He suggests that managers consciously and proactively move forward by 'artfully blending' analysis, behavioural techniques, and power to an end that may remain broadly defined or unstated throughout the process. Incrementalism rejects planned strategies for change on the premise that 'formalised textbook approaches' create false expectations and are rarely followed. Writers on incrementalism argue that low scale, step-by-step development in organisations is both inevitable and logical[31]. They accept uncertainty and compromise in organisational change and propose that strategies for change must be developed in stages, and by trying out new ideas and experiments to see which are likely to be effective. While this approach to change appears to depart from planned and managed change, Charles Handy believes that incrementalism is still continuous change – 'more of the same, only better'. He postulates that real behaviour change only happens with discontinuity, when continuity is no longer assumed and unpredictable events shock us into a new way of doing things. He likens this to a story that a frog put in cold water will not stir if the water is heated slowly, and will eventually let itself be boiled alive because it is too comfortable with continuity to realise that change is required[20]. The analogy with changing behaviour in organisations or individuals within them is that managers would rather believe in continuity, and be able to control and predict, than embrace real change.

The contextualist view of change

Pettigrew, a writer on organisational change throughout the 1970's and 80's, attaches particular importance to the context of change and provides an articulate argument against change as a rational and linear problem solving process[32]. He suggests that the untidiness of history and social processes are important in grounding transformation efforts, and that much research on organisational change is ahistorical, aprocessual, and acontextual. Pettigrew argues that linear theories fail to account for the mechanisms and processes through which change actually happens; exceptional circumstances, unpredictable events and the enabling and constraining forces of the environment all influence change. This contextualist view advocates that change theory must encapsulate the content and context of change as well as the process. Pettigrew distinguishes between the outer context of change – the prevailing social, political and economic circumstances, and inner influences like resources, culture and capabilities. Content is concerned with the 'what' of change, the areas to be transformed, and process refers to the actions and interactions that bring about change. This model affirms the importance of complexity within organisations and the influence of the unpredictable external and internal environments on changing behaviour.

Pettigrew is not alone in considering factors internal and external to the change process and the role of uncertainty in instituting change. Turrill presents an organic and non-linear model that explores the broader dynamic of change, one that acknowledges context and process and recognises the chaotic nature of change. His model considers the role of ice-breaking events and experiments in initiating organisational change[33]. Ice-breaking is akin to an event (often unplanned and external to the organisation) that calls for re-assessment of the status quo; perhaps a change in government, or a national disaster. Ice-breaking could emanate from within an organisation too; a change in management, a surprising finding from clinical audit, an unexpected email or informal conversation with a colleague. The ice-breaking phenomenon could be likened to Charles Handy's theory of discontinuous change. Encouraging experimentation within an organisation can also help to effect change; testing new ways of doing things, or adapting an existing method could lead to improvement. A central tenet of the organic change process is that experiments and random events inevitably lead to successes that can be channelled into a change strategy. Change through creative and innovative actions engages people and provides the opportunity to learn from successes and mistakes. This approach contrasts with the inevitable disappointment if a planned change strategy fails.

Argyris, a psychologist and organisational behaviour specialist of the 1970's, provides a straightforward definition of organic research, which emphasises the role of individual participation in behaviour change programmes:

> 'The thrust of the organic (*change*) programme is to minimize, as much as possible, dependent and submissive relationships...the intention is to involve the clients in the introduction, design, execution, feedback and evaluation of any and all aspects of the (*change*) programme...'[34]

He contrasts this with the mechanistic (or planned, linear) approach, where the manager or change implementer controls the amount of participation by clients (or those involved in change). Argyris advocates for organic change programmes, believing that they provide opportunity for individuals to feel essentially part of the change effort, become more trusting of others, and to develop an effective group that can become the catalyst for change[34]. Hussey agrees with Arygris' principles of organic change. He proposes that extensive participation by those affected can provide ownership of the change, increase motivation, and therefore increase the likelihood that the change will be implemented[7]. Involvement of clients in the process of change and improvement is key to continuous quality improvement efforts as outlined below.

Continuous quality improvement and action research

Total quality management (TQM) is the process of making 'quality' central to an organisation's objectives, and is imperative to most theories of organisational change[4]. TQM is associated with the work of Deming[35] and Juran[36], leaders in quality improvement, who applied quality principles to Japanese industry in the 1950's. However, 'continuous quality improvement', the attempt to maintain quality momentum over time, is a more recent focus of TQM that uses cyclical processes to continually look at new ways to improve current performance. Employee, or client participation is a key component of quality improvement cycles, and can empower people to develop innovative approaches to changing how things are done.

Action research is a continuous quality improvement method that shares many characteristics common to an organic approach – it is context specific, usually involves a change intervention that is focused on improvement, and is based on continuous interaction between all individuals involved. It is a relatively recent development, although the foundations of a participatory approach to changing group behaviour were laid by Kurt Lewin in the 1950's[37]. In the absence of 'proven' effective techniques for improving social and inter-group relations, Lewin argued for action research, research he described as:

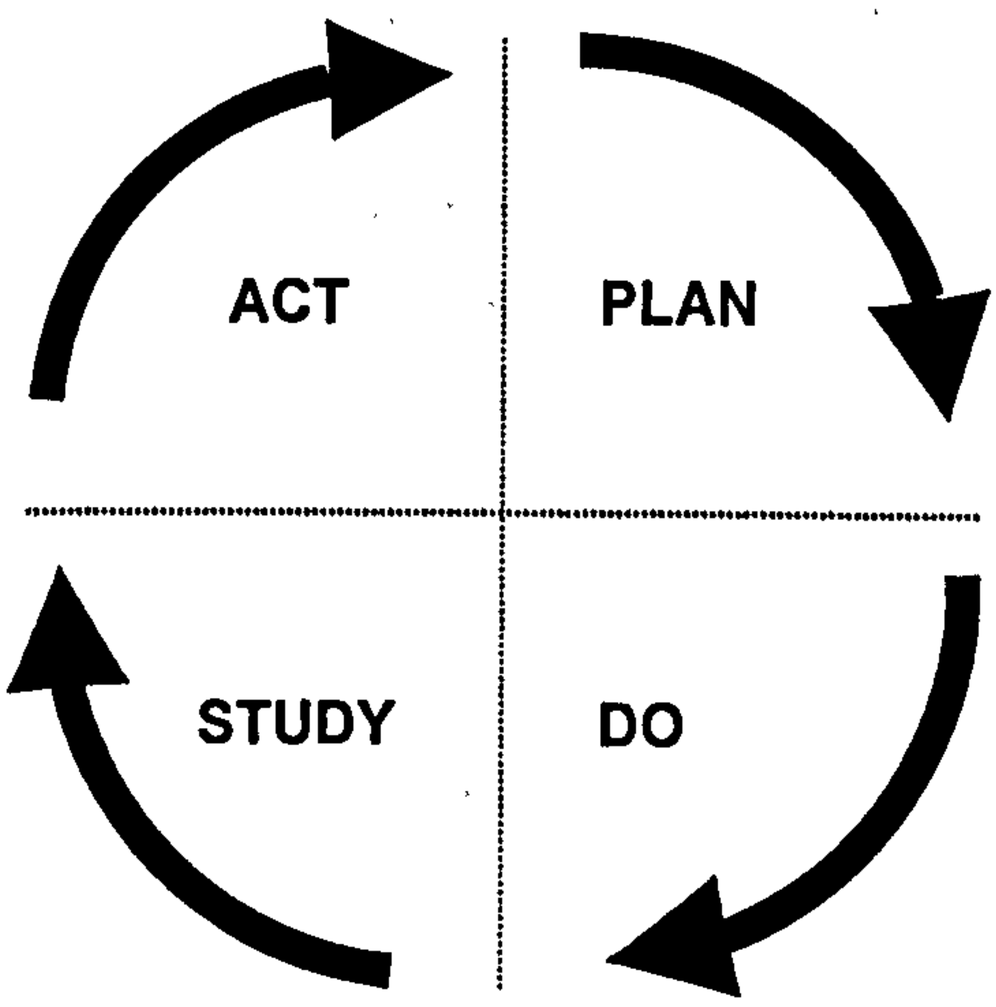
> 'Comparative research on the conditions and effects of various forms of social action, and research leading to social action'[37].

He suggested that diagnosis of a need to change ought to be complemented by studies that compare the effectiveness of various techniques of change. To do this, he recommended a series of steps, each comprising a cycle of planning, action, and fact finding about the result of the action.

Recent definitions of action research are similar to that of Lewin, based on continuous cycles of research, action, reflection and evaluation[38 39 40]. Action research has become a popular research tool for implementing and evaluating change in a number of disciplines including organisational change, nursing and education. A strength of the method is its pursuit of both action and research simultaneously. The 'action' outcome involves individuals in a change intervention to improve a situation, and 'research' is used to understand both the implementation process and the effect of the change. Some argue that the unique empirical standpoint of action research is its strength; knowledge gain through cycles of progressively less 'fuzzy' questions that culminate in theory which should lead to action and improvement[39]. Further cycles of action and research test the effect of the theory – for instance, did it work in practice or not? This method compromises external validity (generalisability) in favour of internal validity (situation specific) and is therefore best applied to situations characterised by complex social interactions and relationships, where control of these and other independent variables is difficult. Perhaps recognition of the importance of context, process and uncertain individual behaviour prompted the use of action research in organisational change programmes.

The plan-do-study-act cycle (PDSA) is continuous quality improvement tool commonly used in organisational change, which closely resembles action research. In discussing the link between improvement and change, Berwick stresses that not all change leads to improvement. However, he proposes that the PDSA cycle can produce changes that lead to demonstrable improvement[41]. The PDSA cycle, originally defined by Langley and Nolan[42], can be used to test small changes through cycles of action and reflection; this helps to identify successful changes and reject change that does not lead to improvement. Figure 2.2 illustrates the PDSA cycle. One criticism of this seemingly rational and instinctive model for change is that experimenting (the 'do' step in the cycle), even on a small scale, is unfamiliar to individuals in any organisation used to planned change that is controlled from the top down. Additional obstacles might include lack of sufficiently strong leadership to promote the use of quality cycles in practice, and resources including time and people available and willing to maintain a CQI programme.

Figure 2.2 The Plan-Do-Study-Act cycle for improvement



Adapted from Berwick[41] and Bookbinder[43]

Plan-do-check-act (PDCA) is a similar model that can be implemented once a process or practice in need of improvement is identified through audit; it is claimed that the PDCA cycle helps individuals bring research into their daily work[43]. Changes are planned and agreed by all participants and baseline data collected (plan), small changes are carried out, effects noted and data collection repeated (do), the results of the changes are analysed and the change process examined (check), and changes that lead to improvement are implemented on a larger scale (act). The strength of the model lies in the act of reflection – learning from what one did. But, for the PDCA or PDSA cycle to gain popularity as a viable model for change in any organisation, individuals must have the capacity to learn from reflecting on the actions they take. This constitutes a new way of learning in the work environment – even though it is the process by which most people gain knowledge and learn in their everyday lives. The challenge lies in encouraging individuals to adopt this learning process in the workplace. As with other quality improvement cycles, obstacles to their implementation include lack of time and resources, commitment, and strong leadership to initiate programmes.

Garvin, an expert on manager's roles in change efforts also points out, there are more failed continuous improvement programmes than successes primarily because continuous improvement requires a commitment to learning. He ascertains that in the absence of learning, organisations and individuals simply repeat old practices [44]. Deming also argues that people are born with 'intrinsic motivation, self-esteem, dignity, curiosity to learn, and joy in learning', but this is undermined and destroyed as people enter workplaces where rewards go to top performers; and quotas, incentive pay and business plans further erode individual's impulse to learn[45]. Conversely, the 'learning organisation', encourages adaptability and harnesses collective aspiration, building organisations where people are continually learning how to learn together[44].

Further discussion of the application of continuous quality improvement initiatives to health care can be found in Annex 2.

Organic change approaches applied to health care services

It is because one dimensional models of change fail to acknowledge context, outer and inner influences on change, and that behaviour is made up of interactions that cannot be managed easily, that more recent attempts to implement change in health care have approached change from a more organic and less linear perspective. The following examples illustrate how organic (or unplanned) approaches to change differ from traditional planned strategies. This section examines the potential of change strategies that are participatory, sensitive to context, and deal with implementation as a process rather than an event.

In a paper dedicated to understanding how to achieve clinical behaviour change, Wood et al challenge linear perspectives and advocate for flexible approaches that go beyond 'unilinear models of information production and dissemination'. They argue for strategies that address local ideas, practices and attitudes and attempt to understand the complexities of the change process[46]. In the UK based case studies presented, the authors criticise linear technology transfer models for assuming that using research in practice involves behaviour change that is rational and predictable. Their conclusions present ideas for achieving clinical behaviour change that could easily be adopted in low and middle-income settings. For instance, they suggest that greater opportunities for consensus building for change will be found in clinical settings where good interpersonal relationships exist; and they stress the role of leaders and respected peers as change agents, creating enthusiasm for an initiative, and bringing local credibility to a change programme. Harnessing the enthusiasm and interest of key practitioners, and involving them in change programme development and implementation is a strategy that can be readily used in developed and developing settings alike.

Ferlie and others[47] present a similar argument when they apply an organisational behaviour perspective to implementing research findings in practice and surmise that it should be regarded as a negotiated and uncertain process. Their case study analysis suggests that this approach is lacking in current implementation efforts within the evidence-based medicine movement.

Kitson and others also question the unidimensional nature of conceptual models that describe the implementation process. They suggest that if linear models are applied literally, they fail to help those involved recognise the complexity of the process and therefore are less likely to be successful[48]. Kitson et al present a 'multi-dimensional' conceptual framework that describes the interplay of evidence, facilitation, and context. They emphasise the need to consider each element simultaneously, not in a linearity of cause and effect. To test the framework, four UK based case studies of implementing evidence in practice were analysed; context, evidence and approaches to facilitation varied in each study. They conclude that successful implementation is influenced by good evidence, receptive contexts and appropriate facilitation of the change. This model is useful for mapping out factors with potential impact on the change process, but it has only been applied to studies in high-income settings retrospectively. However, there are important lessons for the application of research findings in low and middle-income settings. The authors conclude that appropriate facilitation, defined as input from internal opinion leaders and external change management experts, was key to successful implementation. There are good theoretical reasons to suppose that input from both internal (opinion leaders)[49 87] and external experts[50] can also facilitate behaviour change in low and middle-income settings. The findings also highlight the importance of good qualitative analysis of change processes to identify which key elements of interventions actually influence individuals and promote changes to practice; an approach that can be easily incorporated into evaluations of change programmes in any setting.

Titler et al discuss an approach to infusing research into practice in nursing, which is essentially grounded in organic change theory. In the same way Turrill supposes that random events can cause large-scale change in organisations, Titler suggests that 'triggers' are a powerful influence on decisions to change nursing practice[51]. The authors maintain that certain 'triggers' serve as catalysts for nurses to understand the science behind their practice and reject traditional methods. Titler et al present the Iowa model of research into practice[51], which uses 'problem-focused triggers' (clinical problems identified through quality improvement audits), and 'knowledge-focused triggers' that arise from new information about practice (standards and guidelines). The authors suggest that these triggers stimulate staff to resolve problems using a research base or question current practice after reading new information. The approach appears to acknowledge uncertainty and unplanned events as key to changing behaviour of nurses, but there is little discussion of how this works in practice. Titler discusses the importance of communication with all involved and empowering staff with ownership of the change and how it is disseminated. One could attribute the success of this approach to the setting (North America), and question its applicability in low and middle-income settings where nurses work in overburdened, under resourced institutions and the incentive to respond to 'triggers' is limited.

The nursing literature provides other examples of pragmatic research utilisation strategies that use an unplanned, organic approach. In nursing, as in medicine, the gap between research and utilisation remains wide, and bridging that gap remains a priority[52]. White, Leske and Pearcy review various utilisation models that describe how research utilisation should occur in nursing[26]. The Stetler model aims to facilitate the application of research findings and focuses on the capacity of individual practitioners to do this rather than organisations. A central tenet of the model is the use of systematic criteria for nurses to judge whether and how to use research findings in practice. The original model developed by Stetler and Marram in 1976[53] comprised three phases, but recent revisions include six: preparation, validation, comparative evaluation, decision-making, translation/application, and evaluation. The main assumptions of this model are that nurses have access to up to date research findings, adequate skills for critical appraisal and comparison of findings, and the ability to change policies or procedures and implement change. While it is commendable that the model targets individual nurses and attempts to institutionalise utilisation as routine practice, it unwise to assume individual nurses are already equipped with the necessary skills to evaluate research findings, and have the autonomy and power to initiate change without wider organisational support. Linked to these assumptions are explicit reasons why nurses do not utilise research findings, outlined by Hunt[54]:

- nurses do not know about the research findings
- nurses do not understand the research findings

- nurses do not believe the research findings
- nurses do not know how to use them
- nurses are not allowed to use the research findings.

Any model that strives to establish a culture of evaluating and utilising research, whether in nursing or medical practice, must address these issues; to presume that the necessary skills, attitude and authority are already inherent in individual practitioners is unwise. The diversity of experience, education, and status results in varying levels of preparedness; efforts to implement change more often than not require teamwork.

Summary

Box 2.1 Planned versus organic approaches to change

- Approaches that rely on linear models that envisage change as a planned and managed process are often insufficient for effecting change.

- Planned change strategies focus exclusively on change as a linear and one-dimensional process, and encourage a vision of implementation that exudes control and prediction.

- Organic strategies acknowledge that context, as well as key individual characteristics (leadership, reflective learning) and social processes (teamwork, consensus decision-making) all contribute to the success of strategies designed to implement change.

- Few studies to implement change in practice have been conducted in low and middle-income countries, where health professionals work in overburdened, under resourced settings. The applicability of organic strategies, that sometimes require extra resources and time, to these settings is unknown.

2.3 Social and behavioural theories

'...what must one do to obtain a desired effect in given concrete cases? To answer this question it is necessary to have a theory, but a theory that is empirical and not speculative...'

Kurt Lewin, 1936

Since organic strategies consider context, individuals and social interactions key to successful change, it is clearly important to explore in more depth the individual and social processes and interactions that enable behaviour change in individuals and groups. Social and behavioural theories are commonly used to inform strategies aimed at changing health professional behaviour and practice. This section considers the potential role of these theories in understanding individual and social processes that influence health professional behaviour, and therefore the likelihood of change.

Diffusion of innovations theory

The origin of diffusion of innovations theory lies in the study of the adoption of hybrid corn by farmers in Iowa in the 1930's; rural sociologists identified patterns of communication and influence as determinants of adoption[55]. Since then, the theory of diffusion has been most notably progressed by the work of Everett Rogers. In his most renowned publication[56], Rogers reviewed over 500 diffusion and adoption studies in anthropology, rural sociology, educational and medical sociology in an attempt to point out the common threads running through all the research on diffusion of innovations. He surmised that there are four elements in the diffusion of innovations: the innovation; its communication from one individual to another; in a social system; over time. He also distinguished between this diffusion process and the adoption process – the mental process and individual passes through from first hearing about an innovation or idea to actually adopting it in practice. The five stages of adoption identified by Rogers are: 1) awareness (an individual is exposed to an new idea but is not motivated to seek further information about it); 2) interest (an individual becomes interested and seeks further information); 3) evaluation (an individual mentally applies the new idea to his or her present situation); 4) trial (testing the new idea on a small scale to determine acceptability); and 5) adoption (the decision to continue to use the innovation).

It is fairly obvious that individuals will not usually adopt a new idea at the same time; it is more likely that some will lead the way and others will need more convincing, or more time before they attempt to adopt a new idea. The often-quoted adopter categories that explain varying rates of adoption are: innovators; early adopters; early majority; late majority; and late adopters[57 58]. Already the potential usefulness of this theory to conceptualising processes in the implementation of evidence in clinical practice is apparent. However, there are important lessons from the study of diffusion of medical innovations and techniques, which began in the 1950's. Caplow and Raymond conducted one of the first studies of the diffusion and adoption of a new drug in 1954; they sought to determine the influence of opinion leaders in the diffusion and adoption of drugs among medical doctors[59]. Despite minor methodological flaws, interviews with medical professionals ascertained a relationship between opinion leaders (those that interviewees named as influential peers) and innovativeness; an audit of pharmacy prescriptions determined the date of individual doctors' first use of drugs (which facilitated classification into adopter categories).

The influence of opinion leaders remains a well-discussed concept in implementation research; recent studies have validated the notion that early adopters of new clinical evidence are likely to be opinion leaders. For example, Conroy and Shannon propose that those who respond early to guidelines are usually opinion leaders; early and late majority groups may be more sceptical and influenced by opinion leaders and peers; and late adopters may require extra incentives to adopt them[60]. Others have suggested that effective change strategies must allow for different adoption rates among groups of clinicians[61]; a good strategy would be to identify potential opinion leaders prior to a change effort and use their expected innovativeness to influence others in a social group.

In addition to its usefulness in tracing the process by which individuals decide to adopt new ideas, diffusion of innovation theory also offers insight into the influence of the attributes of an innovation on its diffusion and consequent adoption. The four attributes identified by Rogers include the innovations' relative advantage (for the adoptee); understandability; trialbility (extent to which it can be tried temporarily); and observability (how easy one can see whether respected results are being achieved)[55 54]. Others suggest classifying innovations or ideas according to their compatibility with personal and local norms. Becker described the adoption potential of an innovation by medical organisations, and developed a scale that indicates relative benefit and communicability of the innovation, and the extent to which behaviour change was implied by the innovation. Specifying an innovation's characteristics can be useful for explaining resistance to innovations (no perceived advantage; too difficult to test out in practice) and predicting adoption or change in health professionals. For example, a change in practice that requires few extra resources, but is time saving might be categorised as having good adoption potential; whereas that which involves acquiring a new skill might be regarded as having poor adoption potential.

Social influence theory

The value of opinion leaders in changing behaviour is also derived from social influence (or learning) theory, which postulates that individual beliefs and behaviour are strongly influenced by their peers, people in their social group, and society generally. Albert Bandura is the main proponent of this theory, which developed in response to the need to look beyond internal, to external influences on human responsiveness. Until the late 1970's behavioural theorists believed the principle causes of behaviour were forces within the individual, and consequently looked to internal needs, drives and impulses for explanations of why people behave the way they do[62]. The beliefs and values of peers, prevailing social norms[63], and organisational culture all shape an individual's perception and interpretation of information and therefore can influence behaviour change.

This theory is particularly relevant to health care with the current drive towards establishing a culture of evidence-based medicine. In doing so, advocates of evidence-based medicine are acknowledging the potential influence of a 'medical culture' on clinician beliefs. Moulding[56] and others[57] suggest the prevailing medical culture can play a vital role in determining clinicians' beliefs and attitudes, and in turn their practice. Strategies for implementing new evidence that incorporate social influence interventions – that is they use existing cultures and beliefs as a mechanism for instigating change – are therefore likely to be more successful than strategies limited to passive dissemination of information. Social influence interventions might include the use of opinion leaders, academic detailing (or outreach visits) or group education.

To ascertain the potential effect of social influence, Lomas et al compared the use of opinion leaders and audit and feedback (a typical information transfer method) to implement practice guidelines in Ontario, Canada[64]. The guideline recommended clinical action to increase trial of labour and vaginal birth after previous caesarean section. They study found that after 24 months trial of labour and vaginal birth rates in the audit and feedback group were no different to the control group; but for clinicians educated by an opinion leader group, rates were 46% (trial of labour) and 85% (vaginal birth) better than the control group. The opinion leader intervention used peer nominated clinicians to educate their colleagues using 'detailing sheets' similar to those used by drug companies. The authors conclude that the use of opinion leaders can encourage appropriate implementation of guidelines when they agree to be change agents.

A later systematic review of the effect of local opinion leaders on practice and health care outcomes synthesised the results of eight randomised trials involving more than 296 health professionals[65]. The review findings are inconclusive, and the authors suggest that while there is a theoretical basis for the use of opinion leaders the review found mixed effects on professional practice. Interpretation of the included trials was difficult because it was not made clear exactly what the opinion leaders did in their local community to influence their colleagues, and the characteristics of opinion leaders were inadequately defined. In addition, most of the trials (7/8) took place in North American settings and the extent that results are generalisable to other settings is unclear. The review suggests further research is required to determine if opinion leaders can be identified and in which circumstances they are likely to influence the practice of their peers. Perhaps these questions cannot be answered sufficiently using a randomised trial; the systematic review should seek to include study designs more suited to exploring processes of change.

This research aims to contribute to the debate by exploring the role of a locally respected peer in a middle-income setting, and determining if, and how, this opinion leader influences colleague's practice by using rigorous qualitative methods. In addition, the role of the social system in diffusing and communicating new information, and the key components of individual's adoption processes will be delineated through qualitative analysis of experiences of change.

Behaviour change model

The transtheoretical model of behaviour change is a theory that accounts for the role of skills and knowledge in preparing an individual to undertake behaviour change. It considers behaviour change as a continual process and acknowledges the influence of factors other than beliefs and knowledge. The theory gained popularity through the work of psychologists Prochaska and DiClemente who suggest behaviour change consists of five distinct stages of readiness: 1) pre-contemplation; 2) contemplation; 3) preparation; 4) action; and 5) maintenance[66]. Different factors influence behaviour at the different stages, and an individual typically moves back and forth between stages before maintaining a new behaviour. Initial research related to changing addictive behaviours, but the model has more recently been applied to changing the behaviour of health professionals.

Studies that have applied the preparedness model to health professional behaviour comment on its usefulness for identifying different barriers to change experienced by individuals depending on which stage of readiness they are at[67]. At the pre-contemplation or contemplation stage, clinicians might require interventions that provide the motivation to change; while at later stages (preparation or action) change strategies might include skills and support mechanisms to help sustain changes that have been, or are about to be made[68]. Robertson et al also advocate the value of psychological theories to explain behaviour and propensity to change; they apply the preparedness to change theory to explain why an individual clinician's failure to adhere to a guideline[69]. For example, if the main barrier to change is the clinician's unwillingness to change (because current practice is thought to be good enough), training and encouragement would probably be ineffective as the clinician is not ready to change. However, interventions that demonstrate the inadequacy of current practice and the feasibility of change might help the clinician shift from pre-contemplation to contemplation, or from contemplation to action.

Parker and Parikh applied the preparedness model to continuing medical education in Canada. They found that knowledge of the readiness stage an individual is at allows educational programmes to be tailored to specific needs; and consequently the format, duration and content of programmes vary accordingly[70]. Parker et al also emphasise that an individual may not be even at the first stage of preparedness, or even thinking about change – this is common in strategies to implement new evidence in practice. Therefore, outcomes of behaviour change research should not focus solely on producing observable changes in practice or behaviour. A change programme may be successful in preparing an individual clinician for change, or as Robertson[69] and Parker et al[70] suggest, may be capable of moving an individual from one stage to another. These findings have implications for the design and implementation of interventions to change health provider behaviours in other settings. Given the poor access to the most up to date medical evidence in resource poor settings, it is unlikely that providers targeted by a change programme will be prepared and ready to implement changes to their practice, rather they might be in 'pre-contemplation' or 'contemplation' stages. Change programmes implemented in these settings therefore, might usefully consider the preparedness model and use interventions that focus on motivating health providers to change; therefore helping them to shift from pre-contemplation to contemplation, or from contemplation to action.

Summary

Box 2.2 Social and behavioural theories and change

- Diffusion of innovations theory emphasises the importance of the adoption potential of an innovation (or new knowledge).

- The transtheoretical model suggests an individual progresses through cyclical learning stages; changing behaviour is dependent on individual readiness to change.

- Social influence theory considers factors external to the individual, but related to their social system, influence their beliefs, attitude and practice.

- If the design and evaluation of implementation research is specifically linked to both behavioural and social theories, this will enhance understanding of change processes and be more effective in instigating change among health professionals.

- There is a lack of good research into the role of social and behavioural

interventions in facilitating change in low and middle-income settings.

- Rigorous qualitative analysis of change processes might usefully isolate individual and social factors that are important to successful behaviour change.

2.4 Applying a complexity theory perspective

'My friend, there is no road. You make the road as you walk'

Spanish proverb

To understand how the organisational approach (section 2.2) and individual and social contexts of change (section 2.3) interact to initiate and institutionalise change, it seems necessary to accept that not all behaviours within a given context can be controlled or predicted by change models (be they planned or organic). This section considers the potential role of complexity theory, with its innovative perspective on systems and non-linear interactions within them, in understanding the unpredictable and uncertain nature of change.

Defining complexity

Complexity is fast becoming a keyword in modern thought – in the natural sciences, social sciences and humanities alike. The science behind the complexity movement has progressed largely through the work of the Santa Fe Institute in New Mexico; founded by a group of biologists, economists, computer scientists and physicists[71]. But eloquent definitions of complexity theory are lacking. For management theorists and social scientists complexity theory appears to represent a paradigm shift, a new worldview that rejects the assumptions of classical science – namely reductionism, objective observation, and linear causation – and acknowledges unpredictability and non-linearity[72 73]. For natural scientists complexity theory is more than a metaphor; it is about studying the behaviour of collections of interacting units that have the potential to evolve in time[74]. Although still a nascent theory, it has determined fundamental characteristics of systems in an attempt to understand how their component parts interact to generate new behaviour for the system as a whole[75].

Complexity theory offers a new way of conceptualising how factors within a system interact and change. A system can be defined as a combination of parts that are interconnected for a purpose. For instance, Plsek describes the US health care system as a system of various parts (hospitals, clinics, laboratories) that are interconnected (via flows of patients and information) to fulfil a purpose (maintaining and improving health of a population)[76]. Similarly a hospital is a system made up of parts (health professionals, administrators) that interact to diagnose, treat and inform patients. Systems can also be described in terms of their character – mechanical or naturally adaptable. In a mechanical system, for instance a computer network, the behaviour of components (servers, individual client computers, hardware) is largely predictable, and it is possible to know in advance how the system will react in given situations. Conversely, adaptive systems comprise components (for instance humans) that have the freedom to respond and react in unpredictable ways, and unexpected, innovative, and surprising behaviour is the norm.

The mechanistic paradigm is being undermined as uncertainty and non-linearity are acknowledged. Reductionism is a legacy of Newton, Galileo and others' notion of a clockwork universe that can be understood using linearly founded laws, which make prediction possible[77]. Linearity can be expressed by the equation $Y = a + bX$; the value of b gives the amount of change in Y when X changes by one unit[78]. When real variables are used, exact predictions of real *Y*s are not possible; but the degree to which real Ys differ from those predicted by regression equations can determine the strength of the relationship between variables. Such regression equations have been regarded as the laws of science and the search for laws has consisted of attempts to find relationships that can be understood in linear terms, resulting in the ability to plan and control[77]. Linearity and reductionist thinking have survived primarily because they have led to great advances in knowledge and are the foundations of modern life.

But there are limits to linearity – scientists now realise that most systems do not work in a linear fashion. An often-quoted example is that of the weather system; Lorenz showed that climate is a mixture of instability within stability, so the weather may be unpredictable more than a few days ahead, but it does remain within bounds (we know that it will not be 30^0C in London in January). However, a small change in initial conditions can lead to huge differences in outcomes[79]. Capra articulates well the limits of traditional scientific thinking and suggests that the new assumptions of complexity theory may reflect more accurately what happens in reality:

> 'Modern science has come to realise that all scientific theories are approximations of the true nature of reality; and that each theory is valid for a certain range of phenomenon. Beyond this range it no longer gives a satisfactory description of nature, and new theories have to be found to replace the old one, or rather to extend it by improving the approximation.'[80]

Complexity theory addresses components of systems that are neglected or understated by traditional approaches. For example, the study of systems as diverse as the humane immune system, the mind, a colony of ants, the stock market, and the economy reveals several common properties that linear, cause and effect approaches often overlook: adaptability (elements of a system can change); non-linearity (small changes can have large effects on a system); and simple rules (can produce complex outcomes). Mechanical systems are predictable if studied in sufficient detail, but in a complex system, because elements are changeable, interactions non-linear, and outcomes uncertain, behaviour is inherently unpredictable[75].

Complexity in management and organisations

In terms of management thinking and organisational change, complexity theory challenges traditional assumptions. It acknowledges that human activity can lead to emergent behaviour; that is, behaviour that is the result of the interaction of many participants, behaviour that cannot be predicted by knowing how each component behaves in isolation[81]. In contrast, planned change theory assumes that humans can be manipulated to act like mechanical systems that interact and behave in a predictable way. This kind of mechanical thinking that has been intuitively applied to managing change in organisations allows for only two possibilities - plan and control or there will be chaos[75]. A lot of management and organisational change literature focuses on stability, and moving from one stable state to another; but this assumes that the outcome is predictable. Continuous quality improvement and prescriptive models for managing change assume that determinants of performance can be identified, and that there is one effect for each cause. But, if organisation theory can learn from the insights of complex adaptive systems, it becomes apparent that continuous adaptation and improvement are key to change, and general prescriptive solutions are bound to fail. As Priesmeyer points out, approaches that typically rely on creating a vision, mobilising key stakeholders and analysing barriers to change are inaccurately simplistic because they focus on the current situation and fail to understand evolving conditions within an organisation[82].

As Regine and Lewin maintain, accepting organisations as complex adaptive systems requires a different way of thinking that departs from 'plan and control'[74]. Organic models of change (see for example those discussed in section 2.2) focus on people and human processes as key elements in organisations, but complexity theory appears to go beyond these models; it recognises the need to understand how non-linear interactions between these elements can lead to change in whole systems. The new assumptions of complexity theory acknowledge that the essence of an organisation is what individuals do, not what managers plan. However, debate continues among management theorists as to whether there are real parallels between natural adaptive systems and organisations, or whether the similarities are superficial – mere metaphor[83 84].

Some argue the real potential for applying principles of complexity theory to business communities; Parker, Stacey, Levy and others believe that changing and adapting are unavoidable consequences for organisations in a chaotic world[85]. They argue that rather than analysing component parts of organisations and how they can be controlled and changed, managers ought to observe organisations as whole systems that are greater than the sum of their parts. As Levy states:

> 'By conceptualising industries as chaotic systems, a number of managerial implications can be developed. Long term forecasting is almost impossible...and dramatic change can occur unexpectedly; as a result, flexibility and adaptiveness are essential for organisations to survive.'[86]

If human systems (like organisations) do behave in a non-linear way (and it seems likely that they do), that is to say they can adapt, small events or activities within the system can produce large effects, and new behaviour can emerge as a result of interactions between parts of the system; then the future state of an organisation will be unpredictable. Therefore, instead of plan and control strategies, which rely on predicting a desirable outcome, organisations should attempt to create conditions for adaptability. Complexity science suggests it is often best to try different approaches and let outcomes arise by adopting those methods that appear to be working well[87]. The ideas of organic change theorists like Turrill (triggers for change), and Berwick (plan-do-study-act cycles) discussed in section 2.2 are examples of activities that explore new ways of approaching change.

Complexity theory and improving health care

If it possible to draw parallels between natural adaptive systems and management and organisational change, then it follows that complexity theory has potential implications for managing change in health care systems. The seminal work of Plsek[88], a quality management expert well known for his efforts in bringing quality management techniques to health care organisations, provides sound examples of how principles of complexity theory can be applied in health care. Plsek and others argue that as in other complex adaptive systems, health care is populated by adaptable elements (healthcare professionals), inputs have non-linear effects (small changes create have large impact), and there is continuous production of new emergent behaviour as a result of interactions between elements[89]; the future state of the system therefore is difficult to predict.

Plsek argues that treating organisations as complex adaptive systems allows a new and more productive management style to emerge in health care; he suggests effective organisation and delivery of care does not need detailed planning and targets, or command and control methods[90]. Rather he advocates that with a good enough vision, simple rules and small-scale experiments that could result in large outcomes (non-linearity), change can be initiated in health care services.

A common feature of complex systems is 'strange attractors'. These are ideas or attitudes that underpin and explain unexpected human behaviour. Plsek explains that attractor patterns[91] must be fully understood in order to determine the motivations behind individual behaviour; once understood, behaviour can be influenced and change initiated within the system. For example, if past efforts to change practice have focused on cost effectiveness of health care interventions (a major concern of health professionals), then presenting new evidence in terms of how it can reduce costs will more likely result in adoption of the new evidence. In this example, the attractor (concern over cost effectiveness) is used to influence behaviour. Similarly, if the experience of a respected peer has consistently been a determinant of colleagues' practice, then using that peer (the attractor) to introduce new evidence might yield successful change in practice. As Plsek suggests, careful sharing of meaningful information that touches natural attractors, or creates new ones, can lead those within systems to feel they must change[89].

However, strange attractors and determinants of behaviour in health care are poorly understood; and this is one reason why resistance to change is still commonly cited as a barrier to implementing change. Those who seek to change practice and implement change in health care should therefore explore the motivations and incentives of individual practitioners, and use attractors to encourage change[88]. One way to do this is by experimenting with different approaches, and discovering what works best[90]. As Grol et al point out:

> 'Small changes can sometimes have large effects, but we have limited understanding about which small changes to use in which settings and their likely impact.[92]'

Fraser and Greenhalgh argue that non-linear learning techniques can help individual's to adapt to change, generate new knowledge and continuously improve performance[93]. They suggest that capability is as important as competence in ensuring health professionals develop sustainable abilities appropriate for a continuously evolving organisation (the UK National health Service in this example).

Principles of complexity theory can inform new approaches to learning that will equip individuals with skills necessary to strengthen their capability. Individuals (as elements of a complex adaptive system) change because they learn. Learning processes that promote the development of new behaviours in the context of real life experiences allow individuals to adapt to new situations, and therefore engage with change and unpredictability[92]. In other words, existing competencies are adapted to new situations. This is essentially what is required for a change in clinical practice. Additionally, in complex adaptive systems the behaviour of individual elements and the system as a whole adapts in response to interaction and feedback about the effects of actions. Similarly, reflective learning is the key to an individual's learning about the impact of his or her own actions.

Fraser and Greenhalgh suggest several learning approaches that are non-linear, that is they avoid using techniques such as planned, formal events that focus on content, facts and skills (the most widely accepted mode of medical education). Non-linear methods like small group problem solving and case based discussions, and self-directed learning such as mentoring, appraisal and small peer supported learning groups help to focus on the process of learning rather than content. Small group learning can be powerful since the group is able to produce larger effects than the sum of the parts (non-linearity) because social interaction stimulates learning, builds confidence, increases motivation, fosters group consensus building, and can help reinforce and sustain new behaviours[92].

Cycles of action and reflection, similar to the plan-do-study-act cycle[41], also recognise the importance of the process of learning. Cycles of action and reflection can lead to organisational as well as individual learning – and therefore increase the capacity of organisations to change. Peter Senge popularised 'learning organisations' in the early 1990's, but over the last two decades organisation theorists have proposed many definitions of organisational learning. Early definitions included, '...the process of improving actions through better knowledge and understanding'[94], and '...the process of detecting and correcting error'[95]. More recent definitions emphasise adaptability and the ability of organisations to create knowledge through experimentation and reflective learning, and to translate new knowledge into new ways of behaving[96]. Essential to a learning organisation are processes and structures that ensure learning activities happen and that the knowledge gained is integrated. These might include building skills to aid learning – like brainstorming, problem solving, questioning the status quo – through regular meetings that cut through existing hierarchies and boundaries. Many organisations have successfully adopted learning approaches, and Senge outlines several examples of how various managers shifted beyond mechanical, linear thinking (which is said to undermine the potential for learning) towards adaptability and capability to respond to new knowledge and adjust to change[97].

Summary

Box 2.3 Complexity theory and change

- Humans are adaptable, and behaviour of individuals within a system cannot be predicted.
- Small events might or might not produce large effects in a system, so outcomes are unpredictable.
- To initiate change requires exploring the motivations of individuals, and using attractors to encourage change.
- There has been little empirical work to date that applies complexity theory to implementation research (in high or low income settings), but experimenting with small changes can help to discover what works best.

2.5 Summary of approaches to implementing change

This chapter has provided an overview of the literature around important change theories and their application to health care. The review discussed planned and organic organisational approaches to change, relevant social and behavioural theories that are useful for exploring context of change, and complexity theory, which helps to understand the unpredictable and uncertain nature of change. This section summarises what is currently known about implementing change, what components an effective change strategy might comprise, and what this research adds to current debate.

What is known

- In terms of organisational change theory, the literature suggests that approaches that rely on linear models, where change is envisaged as a planned and managed process, are often insufficient for effecting change (box 2.1). Indeed, this type of approach has frequently been applied in health care, with few successful results. Where organic strategies have been applied, more effective change has ensued. Organic approaches are sensitive to the context of change, and accommodate individual and social processes that are essential components of change. However, there has been little implementation research conducted in low and middle-income countries, and the applicability of such strategies to these settings is unknown.

- Social and behavioural theories highlight important individual characteristics and social processes that facilitate behaviour change (box 2.2). The literature suggests that change strategies should be based upon sound knowledge of the adoption potential of a new idea, individual readiness (for change), and the influence of peers and the social system on an individual's behaviour. Some strategies to help implement change in health professional practice have drawn on specific theories; but an approach that draws on both social and behavioural theories might be more effective. There is a lack of research on the role of interventions informed by social and behavioural theories, for facilitating change in low and middle-income settings. In addition, the process of change, and how individual and social processes facilitate the translation of knowledge into practice, requires further exploration using rigorous qualitative methods.

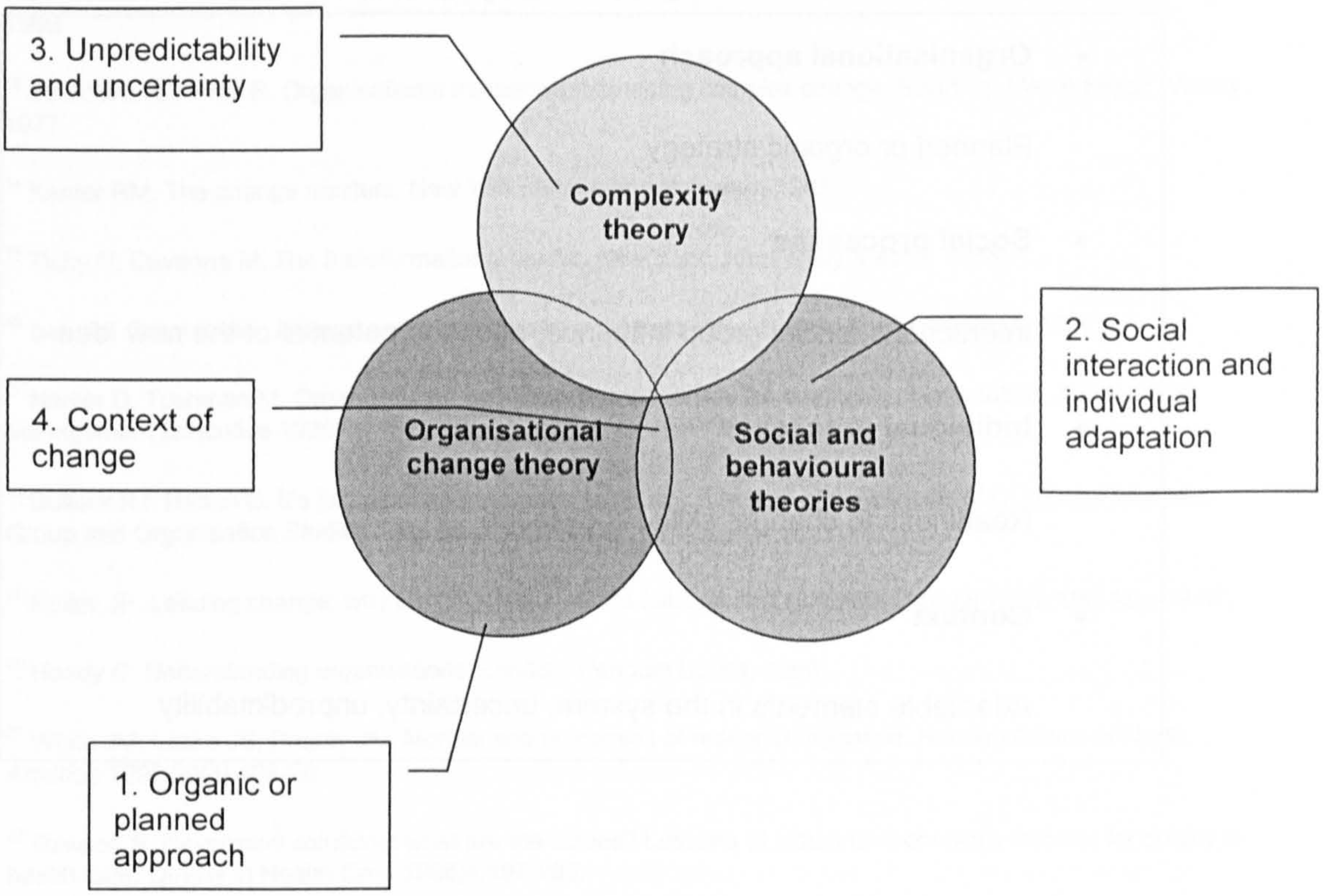
- Complexity theory, with its innovative perspective on systems and non-linear interactions within them, has potential for helping to understand the unpredictable and uncertain nature of change. A change strategy that employs an organic organisational approach and is based on social and behavioural theories might yield successful change in practice; but complexity theory helps explore exactly which components, or events, are responsible for the change. There has been little empirical work to date that applies complexity theory to implementation research (in high or low income settings), but experimenting with small changes might help to discover what works best (box 2.3).

Towards an understanding of 'critical factors' for change

Figure 2.3 illustrates the interconnectedness of the change theories discussed in this chapter; it is useful for conceptualising likely key components of a change strategy and critical factors that might influence diffusion of knowledge into changed behaviour (see the research problem outlined in section 1.3).

Organisational change theory presents two alternatives for implementing change: plan and control or 'muddle through' with an organic strategy. Social and behavioural theories highlight the importance of delineating social interactions and individual adaptive behaviours that help facilitate diffusion of knowledge into changed behaviour. Complexity theory acknowledges that any approach to change comprises elements that are unpredictable and uncertain. What all these change theories have in common (where they overlap), and what any change strategy should consider, is the context of change.

Figure 2.3 Interconnectedness of theories around change



Drawing on the various theories of change, it is possible to delineate critical factors that are likely to influence whether new medical knowledge is translated into changed health professional behaviour. Box 2.4 lists categories of factors that should be considered when developing a change programme.

Box 2.4 Factors that could influence translation of knowledge into changed health professional behaviour

- **Organisational approach**

  Planned or organic strategy

- **Social processes**

  Interactions, social group influence, adoption potential of the new idea

- **Individual processes**

  Readiness to change, skills, knowledge

- **Context**

  Adaptable elements in the system, uncertainty, unpredictability

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Chapter 3 Development of the change programme

3.1 Introduction

This chapter outlines the development of a multifaceted change programme, the main intervention used in this research. The first section summarises the evidence from systematic reviews of the effects of commonly used obstetric practices. Section 3.3 describes observational studies conducted in several low and middle-income settings, which helped to identify gaps between current evidence and actual practice. The results highlighted areas in need of change, and where changes could be made without extra resources or effort. Subsequently, a multifaceted change programme (the intervention used in this research) was developed to influence obstetric practice in one middle-income setting (South Africa). The characteristics of the intervention are described in detail in section 3.4.

3.2 Obstetric practice in resource-poor settings

Increasing proportions of women in resource-poor settings are choosing to give birth in a hospital or health facility for normal and complicated births[1]. Basic obstetric care in the hospital setting appears to be effective in reducing maternal and neonatal deaths[2]. However, there is a tendency to treat all births routinely, and with the same level of intervention[1]. The medicalization of normal birth is widely debated in the literature[3 4 5]; but humanising childbirth is not the focus of this thesis. A more important concern is that because of the level of care, services and resources available in resource-poor settings, sometimes the procedures used and the attitudes of staff make women less likely to use the service, including those at high risk. Interventions that have no benefit, or are potentially harmful to women or their newborns continue to be practised; while interventions that are demonstrably useful and could save lives are not routinely practised[6]. It is imperative that staff use life-saving and cost-effective interventions, and provide care in a way that encourages women to use the service.

Systematic reviews of obstetric practices

Evidence for the effects of procedures commonly used during childbirth is available through systematic reviews published on the Cochrane Library[7]. An influential document produced by WHO- 'Care in normal birth: a practical guide' - usefully categorises practices, after consideration of the available evidence, into a) practices that are useful and should be encouraged; b) practices which are clearly harmful and ineffective and should be eliminated; c) practices for which insufficient evidence exists, which should be used with caution; and d) practices which are frequently used inappropriately[1].

Table 3.1 lists practices relevant to low and middle-income settings, where there is good evidence from systematic reviews of benefit or harm. With reference to the systematic review findings, practices are categorised into those that improve outcomes and should be routine, those that improve quality of care and should be encouraged, and those that do harm and should be avoided.

The benefit of prophylactic steroids in preterm birth is well established. A systematic review of eighteen trials including 3,700 babies found that steroids given prior to preterm birth prevent respiratory distress syndrome and neonatal mortality; the beneficial effects were documented in trials as early as the 1970's [8]. Similarly, the benefit of magnesium sulphate in treating eclampsia is well established, and it is now accepted as the gold standard drug against which any new anticonvulsants should be compared[9]. The systematic review of companionship during labour clearly shows that it is associated with a reduction in the likelihood of medication for pain relief, operative vaginal delivery, caesarean delivery, and a 5-minute Apgar score less than 7[10].

Conversely, there is good evidence of the ineffectiveness, or potential harm associated with routine use of some common practices. A systematic review of just two trials suggests there is insufficient evidence to recommend routine use of enemas[11]; and given the costs involved it seems justified to discourage their use in resource-poor settings. In a systematic review of perineal shaving on admission, just two trials met the inclusion criteria, and the reviewers conclude that the evidence to date offers no support for routine shaving of women prior to labour[12]. A systematic review of six trials suggests that restrictive, rather than routine, episiotomy is associated with less posterior perineal trauma, less suturing and fewer complications, no difference for most pain measures and severe vaginal or perineal trauma, but an increased risk of anterior perineal trauma[13].

Table 3.1 Obstetric practices categorised by evidence of effects from systematic reviews

Category of use	Practice
Improve outcomes, should be routine	Prophylactic corticosteroids for preterm birth
	Prophylactic antibiotics for caesarean section
	Prophylactic oxytocin in third stage of labour
	Magnesium sulphate for women with eclampsia
Improve quality of care, should be encouraged	Companionship during labour
	Antibiotics for preterm, prelabour rupture of membranes
Harmful, should be avoided	Routine enemas
	Routine perineal shaving on admission
	Routine episiotomy
	Supine position for delivery

Other practices that improve quality of care, but where systematic review evidence is lacking, include oral (rather than intravenous) fluids during labour, and mobility during the first stage of labour. Evidence for the benefit of these practices is derived from good quality randomised controlled trials, and the findings documented in the WHO guide[1]. The available evidence suggests that restricting oral intake can lead to dehydration and ketosis; the WHO guide recommends offering oral fluids during labour and that intravenous infusion represents and unnecessary intervention in normal birth. Trials comparing supine position with standing, walking, sitting upright, or taking a bath or shower have found that ambulation or mobility during the first stage of labour is associated with less pain, and less need for pain relief and augmentation[14].

Despite the increased emphasis on evidence-based practice, practices with little benefit or potential harm continue to be used, and those with clear evidence of benefit are not routinely practised. Examples outlined in section 1.1 include the delay in adopting routine use of steroids in preterm delivery, continued use of routine episiotomy and providers favouring alternatives to magnesium sulphate.

One reason why outdated interventions continue to be practiced in low and middle-income countries is the lack of reliable and up to date information available to health workers in these settings. To address this need, the World Health Organization produces the Reproductive Health Library (RHL); an electronic journal that contains selected Cochrane systematic reviews on reproductive health issues of high priority in developing countries[15]. RHL is updated annually, and distributed free of charge to health workers in these settings. A trial is underway in Mexico and Thailand to investigate whether an active RHL dissemination strategy using interactive workshops improves obstetric practices[16].

Applicability of evidence-based obstetric practices to developing countries

An assumption of strategies to promote evidence-based standards in practice is that interventions with evidence of benefit will be culturally appropriate, relevant and acceptable to people in different settings. For example, the systematic review of companionship during labour shows clear benefits in terms of improved maternal experience, quality of care, and maternal and infant outcomes[12]; the systematic review includes research conducted mostly in developed settings, but also in South Africa, Botswana, Mexico and Guatemala[12]. What is needed before this intervention is promoted in practice is an assessment of its relevance and acceptability to women in different settings. Expert commentary on the review suggests the need for further trials in under-resourced settings[17], which might help to assess the barriers to uptake of the intervention in these settings.

Traditional home births are likely to enable companionship, and in many parts of the world support for women during labour is a cultural tradition[5 18], kept alive by traditional birth attendants[19 20]. Anecdotal evidence from Botswana suggests that traditional birthing practices among rural black Batswana people ensure a traditional birth attendant and at least one other female relative attend women in labour, giving continuous support and encouragement[21]. Similar traditional cultural practices still prevail in other rural areas of Africa[22 23 21]. But as more women choose to deliver in an institution, the discrepancy between traditional birthing practice and hospital policy is increasingly apparent. The details of traditional practices are lost in hospital-based deliveries, where women can expect to spend long periods alone, deliver unaccompanied, and even neglect and abuse from nursing staff[22]. Re-introducing the concept of support during labour for women delivering in hospital requires in-depth understanding of, and sensitivity towards, women's preferences and provider's attitudes.

Recent research conducted at a teaching hospital in Zambia attempted to delineate women's and provider's views about involving companions during labour in institutional deliveries; the author defined a social support person as a female who accompanies a labouring woman to the maternity unit and remains with her until birth of the baby[23]. The results show that over 60% of the postpartum women interviewed wanted a support person to be present during labour; preferences included a mother, sister, or cousin and no women mentioned the husband as a first choice. Women's negative views about support during labour included the belief that the hospital and health care staff has responsibility for care; having a support person could be embarrassing; and that a support person could spread rumours about the woman's behaviour during labour. Provider views about support during labour were also divided; but structural and space constraints, and the belief that support persons would interfere with care were the main reasons for opposing the practice. While the study is small (84 mothers and 40 health care staff), it focuses on female companions only, and the findings from Zambia might not be transferable to other African countries, they do provide an indication of the social and cultural factors that affect women's preferences for or against support during labour.

The cultural relevance and appropriateness of other clinical obstetric interventions where there is good evidence of benefit from systematic reviews, for instance prophylactic corticosteroids for pre-term birth and prophylactic antibiotics for caesarean section, is incontrovertible. In addition, many of the purely obstetric invasive interventions, such as routine enema or episiotomy, usually do not have cultural precedents.

3.3 Country studies[i]

Information about the effectiveness of practices used during childbirth is insufficient to change health professionals' practice[24]. A first step towards changing practice is to highlight areas where practice is inconsistent with the evidence and change is needed, and where changes to practice can easily be made. The intervention used in this research to influence practice is based on data from observational studies of obstetric practice conducted in China, South Africa and Zimbabwe.

The studies used similar methods to determine current practice on labour wards in low and middle-income settings. Findings from the China study, published in 2001, found variation in provider practice between hospitals[25]; and data from the other studies highlights the gap between provider practice and current best evidence for some interventions.

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[i] The country studies were conducted in collaboration with Kassam Mahomed (University of Zimbabwe, Harare), Qian Xu (Fudan University, Shanghai, China), and Justus Hofmeyr and Heather Brown (University of Witwatersrand, South Africa). I contributed to the conceptual development, design of data collection tools, data collection and analysis in the Zimbabwe, China and South Africa studies.

Methods

Observational studies were conducted between 1998-2000 in purposefully selected government hospitals in Harare, Zimbabwe (1998)[26], Shanghai, China (1999)[25], and Johannesburg, South Africa (2000)[27]. In collaboration with the University of Harare, a note audit was used to extract information on the use of enema, amniotomy, pethidine and episiotomy for 501 normal spontaneous deliveries at a referral hospital in Harare; data relating to use of antibiotics with preterm rupture of membranes and prior to Caesarean delivery was collected from 40 and 48 case notes respectively. With collaborators at Fudan University, Shanghai, and the University of Witwatersrand, Johannesburg, a structured exit interview was used with postnatal women to document practices used during childbirth at four and ten government hospitals respectively. Findings relating to women's experience of pain during childbirth at the study sites in China and Zimbabwe have been published elsewhere[28].

Findings

China

Table 3.2 shows current practice at the four study sites in Shanghai; practices are categorised using the same criteria outlined in table 3.1, with reference to evidence from Cochrane systematic reviews. Sample sizes are small, but a comparison of practice rates at four different hospitals increases reliability of the data. The results indicate that some practices where the evidence suggests avoidance remain common practice; and for procedures that should be routine, practice could improve at some hospitals.

For example, episiotomy is frequently used, with rates above 85% at three hospitals; perineal shaving is common practice, with rates above 90% at three hospitals. Current practice is similar for rectal examination, and supine position is used routinely across all study sites.

Current practice could improve for some practices that should be routine or at least encouraged. At one hospital oxytocin is used routinely (96%), but other hospitals use it infrequently, particularly the specialist hospital (17%). Mobility during labour is promoted at the district hospital where 56% of women in the sample were encouraged to be mobile; but practice could improve at the other hospitals where rates of use are lower.

Conversely, there are some interventions where current practice is consistent with the evidence. Enemas were used infrequently at three hospitals (less than 2%), and less than 50% of women across all study sites were given intravenous fluids. These findings are compatible with current best practice, which recommends avoidance.

Table 3.2 Current practice for selected obstetric procedures at four hospitals in Shanghai, China.

	Current practice (%)			
Current evidence	**Specialist hospital**	**City MCH hospital**	**District hospital**	**County hospital**
Vaginal deliveries (N)	75	82	41	105
Should be routine				
Postpartum oxytocin	13 (17)	79 (96)	14 (34)	34 (32)
Should be encouraged				
Mobility during labour	27 (36)	19 (23)	23 (56)	8 (8)
Companionship	6 (8)	30 (36)	38 (93)	1 (1)
Should be avoided				
Routine enema	1 (1)	1 (1)	22 (54)	0 (0.0)
Routine perineal shaving	0 (0.0)	82 (100)	39 (95)	98 (93)
Routine episiotomy	70 (93)	74 (90)	36 (88)	68 (65)
Rectal examination	71 (95)	0 (0.0)	39 (95)	103 (98)
Intravenous fluids	36 (48)	18 (22)	3 (34)	39 (32)
Supine position	75 (100)	82 (100)	41 (100)	102 (97)

Source: Analysis of exit interview data[25]

Zimbabwe

Table 3.3 illustrates current practice at one urban referral hospital in Harare, and is therefore not representative of practice at hospitals in other areas, of different levels, or countrywide. In addition, data relating to antibiotics with preterm rupture of membranes and prior to Caesarean delivery must be interpreted with caution owing to the small sample sizes.

The data reveal many consistencies between current practice and the available evidence. For example, 83% of women received antibiotics prior to Caesarean delivery, and 90% of women in the sample received antibiotics with pre-term rupture of membranes. Where the evidence suggests avoidance, the data reveal that current practice for enemas and intravenous fluids is consistent (less than 2% in this sample). The episiotomy rate, 43% in this study sample, also appears to be consistent with the evidence, which suggests a restrictive policy.

Companionship during labour is not currently encouraged or practised at this hospital; this is an area where practice could improve.

Table 3.3 Current practice for selected obstetric practices at a government hospital in Harare, Zimbabwe.

	Actual practice
Current evidence	**n/N (%)**
Should be routine	
Antibiotics prior to CS	40/48 (83)
Should be encouraged	
Antibiotics with PROM	36/40 (90)
Companionship during labour	0 (0.0)
Should be avoided	
Routine enema	6/501 (1)
Routine episiotomy	215/501 (43)
Amniotomy	245/501 (49)
Intravenous fluids	1/501 (0.2)

Source: Case note audit[26]

South Africa

Table 3.4 shows a summary of obstetric practice at ten hospitals in Johannesburg, South Africa. An average of 200 women at each hospital were interviewed and aggregate data are shown in the table. Although the sample size is large and the results are therefore likely to be valid, the summary data do not adequately portray varying practice rates between hospitals.

For mobility during labour, where the evidence suggests the practice should be encouraged, the data highlight an interesting trend. Over 50% of women at the ten study sites were able to move around during the first stage of labour, but mobility during second stage was infrequent (3%); there is clearly some consistency with the evidence, but practice could improve. Companionship during labour was allowed in 15% of deliveries; given the multiple benefits of support during labour, practice could also improve for this intervention.

The episiotomy rate was 35.1% in this study sample, which reflects selective rather than routine practice and this is compatible with best evidence.

For procedures that should be avoided, including enemas and intravenous fluids, practice at the ten hospitals in Johannesburg indicates the need for some improvement. The data show that enemas were used in 53%, and intravenous fluids in 41%, of normal deliveries; these practice rates deviate from current best evidence and could be improved.

Table 3.4 Current practice for selected obstetric procedures at 10 hospitals in Gauteng province, South Africa.

	Actual practice
Current evidence	**n/N (%)**
Should be encouraged	
Mobility during 1st stage	1111/2084 (53)
Mobility during 2nd stage	61/2072 (3)
Companionship	322/2085 (15)
Should be avoided	
Enema	1098/2087 (53)
Episiotomy	727/2073 (35)
Intravenous fluids	877/2090 (41)

Source: Analysis of exit interview data[27]

The findings presented above, from observational studies in China, Zimbabwe and South Africa provide an indication of current obstetric practice in these low and middle-income settings. Using indicators of good obstetric care, based on evidence from systematic reviews, helped to identify gaps between what is currently known and what is practised. Within the individual studies, some practices were consistent with available evidence, but it was easy to identify areas in need of change. Procedures that were commonly inconsistent with the evidence or required improvement include the use of episiotomy, enemas, intravenous fluids, companionship and mobility during labour. These results were used to inform the content of the change programme, subsequently developed and used as the intervention in this thesis. The next section describes the characteristics of the intervention in detail.

3.4 Characteristics of the change programme

To maximise the likelihood of initiating change in obstetric practice in the areas identified by the baseline observational studies, a change programme was designed to include critical factors likely to influence the translation of new medical knowledge into changed health professional behaviour identified in the literature review (see box 2.4, chapter 2). The programme used an organic approach and various interactive educational components, targeted focused areas of obstetric practice in need of change, and used an opinion leader to influence peer behaviour.

Multi-faceted strategy

The change programme can be described as multi-faceted since it employs several interventions simultaneously in an attempt to influence practice. The main component of the programme was an educational workshop that targeted all labour ward staff engaged in obstetric practice. Other studies have used interventions that target senior staff only on the basis that they are likely to be, or were identified as, opinion leaders able to influence the practice of their colleagues[29 30]. This study did not attempt to identify opinion leaders in each labour ward, since their influence would not be sustained throughout the study; high turnover of staff in this setting means senior professionals do not remain in any one hospital for more than a few months. Alternatively, the study used a local opinion leader to facilitate the workshop intervention. The opinion leader was a senior obstetrician (Dr Brown); well known to staff in the study units, and with a sound knowledge of evidence based obstetric practices. It was assumed that health professionals would be more likely to accept and use information introduced by a member of their social and professional group than by an outsider; this corresponds to principles of social influence theory (see box 2.2, chapter 2).

A single workshop, usually between 2 ½ to 3 hours duration, was conducted at each study site. In a middle-income setting such as this, resources are scarce and cost effectiveness is important. The importance of number of outreach visits remains unclear[31]; but if this intervention is proven effective as a single educational visit, the feasibility of using the programme in other provinces will be greatly enhanced.

The workshop intervention can be described as both an educational outreach activity and a continuing education workshop, and there is good evidence from systematic reviews of the effectiveness of each of these methods[32 31]. The workshop comprised a variety of educational materials, some of which were in traditional printed format. Available evidence suggests that printed educational materials alone have only a small impact on practice[33]; therefore alternative formats including video, audio-visual, and visual aids were also used (see Box 3.1). During workshops, the facilitator outlined basic principles of evidence-based obstetric practice using a Powerpoint presentation, and worked through a series of exercises with participants, to examine their current practice and identify ways to make changes. Obstetric topics covered during the workshop were largely determined by participants and prompted by the workbook exercises. Topics most commonly discussed were: the use of enemas; episiotomy; companionship during labour; perineal shaving; oral fluids; position during delivery; and mobility during labour. Reference booklets summarising the evidence for each topic were left with staff at each unit, together with wall posters and spare copies of workbooks.

Box 3.1. Educational workshop materials

Workbook	To guide group discussion around benefits and harms of procedures; exercises examine current practice, and identify ways to change practice.
PowerPoint presentation	An introduction to evidence-based practice, which summarises the evidence for obstetric procedures.
Reference booklet	A summary of the best evidence; concise, quick-reference style.
Journalistic style video	Real experiences of implementing companionship in labour wards in South Africa.
Posters	Showing procedures that the Initiative promotes; designed to be displayed in labour wards and antenatal clinics.

Workshops were delivered in an informal way, and designed to be interactive since review findings suggest that this approach can result in moderately large changes in professional practice[32]. At all times, participants were encouraged to contribute; the structure of each workshop allowed adequate time for discussion both among participants and with the facilitator. The change programme used an unplanned, organic approach (see box 2.1, chapter 2) that enabled individual units to decide on their own strategy for disseminating the information among colleagues and implementing change. The maternity units were encouraged to use the extra materials provided to hold meetings with colleagues unable to attend the workshop, and to stimulate discussion.

A structured self-audit mechanism was introduced at intervention sites to help staff monitor changes to their practice. The facilitator suggested staff conduct an audit of selected procedures once a month, and provided wall charts to record the changes. There is evidence that audit and feedback can be effective in improving the performance of health care providers, but the effects are generally small to moderate and the effectiveness of combining audit with other interventions is unclear[34]. It is possible that 'self-audit', where labour ward staff take responsibility for auditing their own practice will help institutionalise a culture of quality improvement and encourage reflection on changes to practice, which is a key component of continuous quality improvement cycles (see section 2.2, chapter 2).

Figures 3.1 - 3.4, shown at the end of this chapter, illustrate the educational workshop materials, some of the materials in use, and workshop participants at some of the study sites.

Attributes of the change programme

It is useful to describe interventions to change health professional behaviour systematically by defining their characteristics and innovative elements. Hulscher et al suggest that characteristics of interventions might include details such as: flexibility (degree of variation in delivering the intervention); timing (number, duration and frequency of intervention events); content (messages, specific information contained in the intervention); medium (for delivering the intervention); sender (or facilitator involved in delivering the intervention); and the participants in the intervention[35]. Table 3.5 outlines the attributes of the change programme used in this study.

Table 3.5 Attributes of the multi-faceted change programme used in this study

Element/characteristic	Description
1. EDUCATIONAL WORKSHOP	
Target population	*Labour ward staff* All levels of staff available on the day of the workshop were encouraged to participate.
Facilitation	*Local opinion leader* A credible and well-known senior obstetrician facilitated the workshop.
Timing	*Single visit, short duration* Each study site received one 2 ½ to 3 hour workshop. Progress was followed up with a phone call to each unit.
Content	*Educational and based on rigorous evidence* Workshop used a variety of educational materials, not just printed matter. Information delivered in the workshop was based on systematic review findings.
Mode of delivery	*Interactive, informal* Workshop and was conducted in an interactive manner; active participation of attendees encouraged.
Variation	*Standardised intervention* All study sites received the same workshop; there was no variation in any of the above elements.
Organisational approach	*Organic and unplanned* Participants were encouraged to decide on their own strategy of dissemination and implementation; the facilitator did not plan activities.
2. SELF-AUDIT MECHANISM	*Intervention sites* At intervention sites, the only difference was the introduction and explanation of the self-audit mechanism at the end of the workshop.

3.5 The Better Births Initiative

For the purpose of this thesis, the educational workshop and self-audit were tested in one province in South Africa (see section 4.4, chapter 4). After the study showed some impact on provider behaviour, the workshop and associated materials were packaged as the 'Better Births Initiative' and subsequently rolled out to maternity units in other provinces (Eastern Cape, Western Cape, and KwaZulu-Natal). More information about the Initiative can be found on the website[36], developed and maintained by the principle investigator (PhD student), and a recent joint publication between the Global Health Council, Liverpool School of Tropical Medicine and WHO which outlines the development and progress of the Better Births Initiative[37].

Figure 3.1 Materials used in the educational workshop

Figure 3.2 Posters and self-audit in use at a study site

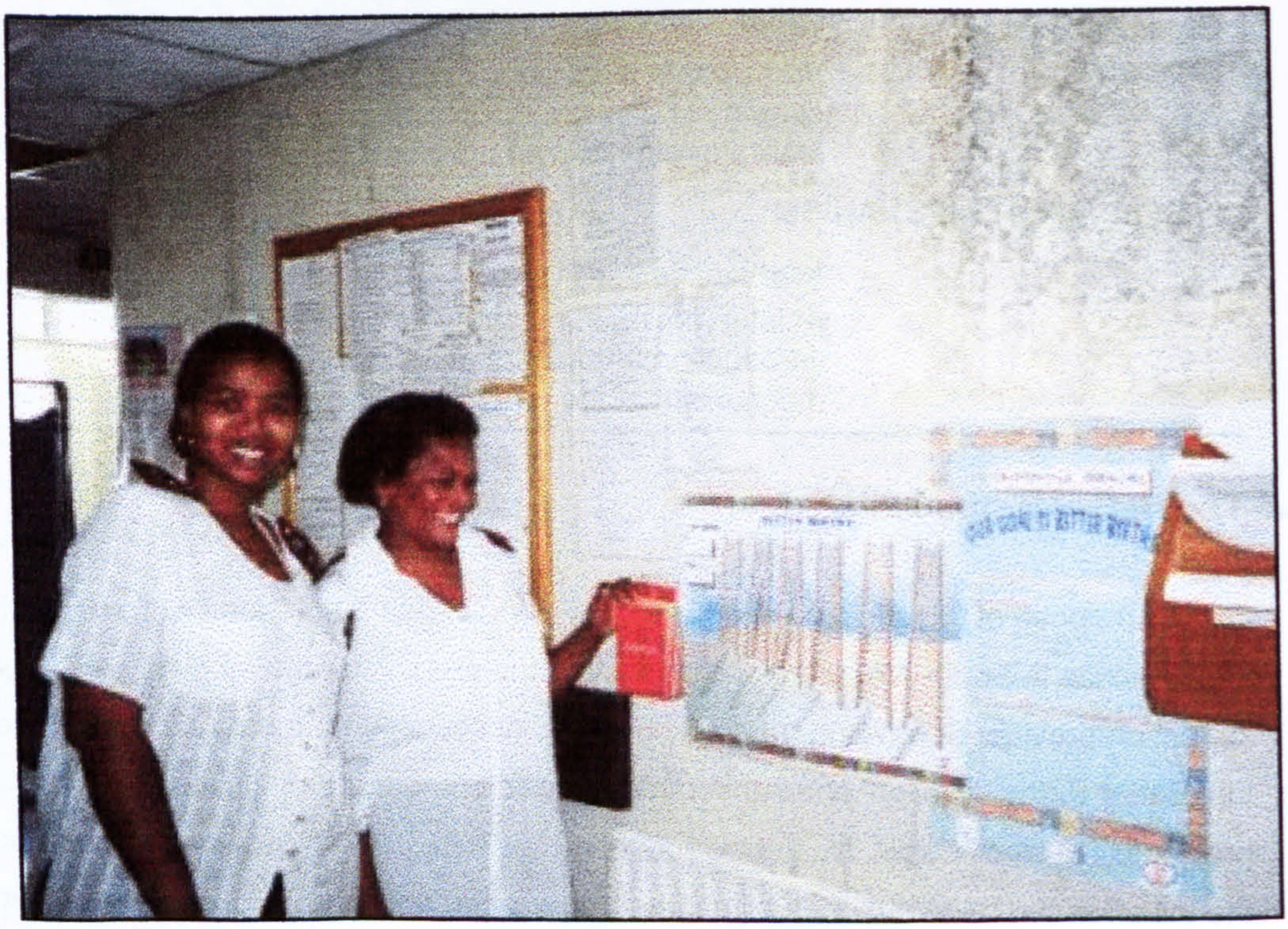

Figure 3.3 Using workshop posters in the labour ward

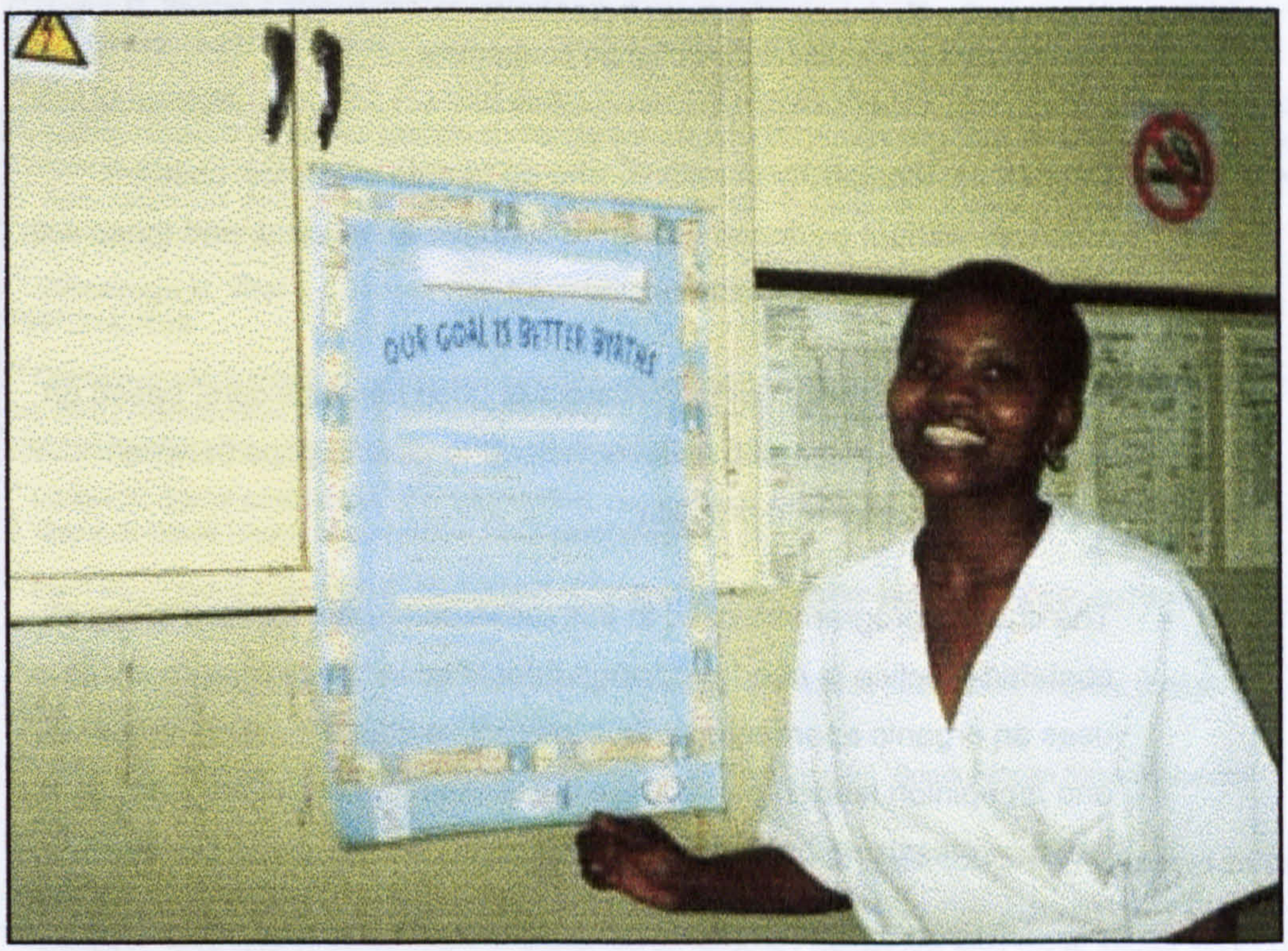

Figure 3.4 Educational workshop participants at a study site

3.6 Summary

Box 3.2 Development of a multi-faceted change programme

- Despite the availability of reliable and up to date evidence, obstetric practices without evidence of benefit continue to be used, and those with clear benefits are not routinely practised.
- Observational studies using indicators of good obstetric care, based on evidence from systematic reviews, helped to identify gaps between current knowledge and practice.
- The change programme used in this research targets focused areas of obstetric practice in need of change (identified in baseline studies); it uses an organic approach, various interactive educational components, and an opinion leader to maximise the likelihood of initiating changes in health professional behaviour and practice.

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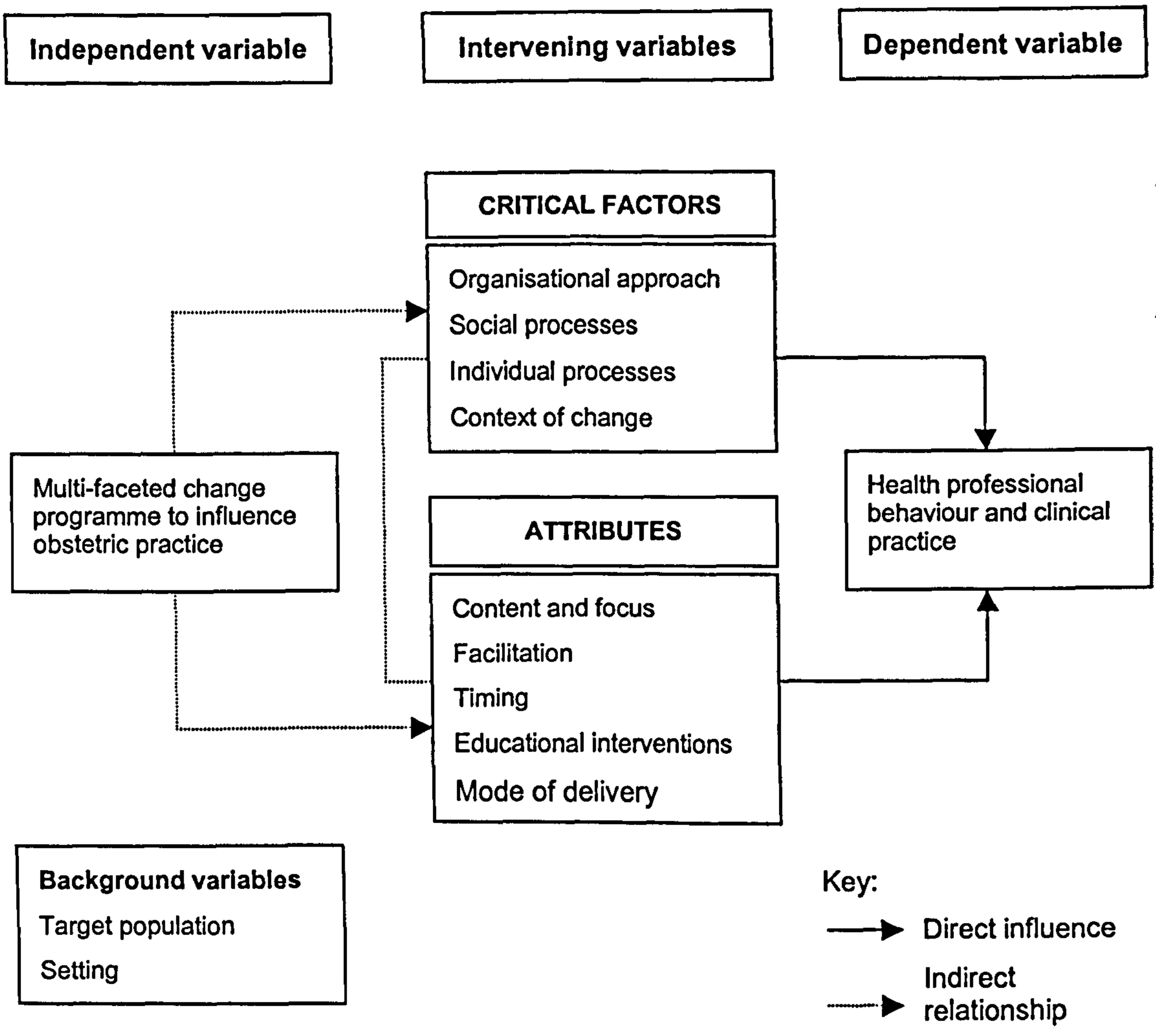
Chapter 4 Methods

4.1 Conceptual framework

The literature review in chapter 2 helped to identify critical factors likely to influence the translation of knowledge into changed health professional behaviour, and chapter 3 outlined the attributes of the change programme designed to influence obstetric practice; variables that might influence the effect of the change programme. The conceptual framework in figure 4.1 illustrates the interrelationship of these variables and their influence on health professional behaviour and clinical practice. As the framework depicts, the independent variable influences or determines the dependent variable (and can influence other independent variables)[1]. In this study the multi-faceted change programme represents the independent variable, designed to influence health professional behaviour and practice (the dependent variable). The framework also specifies intervening variables – the independent variable acts on the dependent variable through intervening variables. In this case, intervening variables include critical factors likely to influence change, and key attributes of the change programme, - both may influence the effect the change programme (independent variable) has on change in health professional behaviour and practice (the dependent variable). Background variables are specific to the study, and include the target population and setting, which in this case are health professionals working in obstetrics in a middle-income setting.

Figure 4.1 Conceptual framework showing the interrelationship of variables likely to influence change in health professional behaviour and practice.



The conceptual framework depicts how the independent variable operates through the intervening variables, to influence the dependent variable. The change programme alone will not directly influence health professional behaviour and practice; but several critical factors, and key attributes of the programme, are likely to determine the effect of the change programme. Critical factors include the organisational approach used; social and individual processes of change; and the context of change (see box 2.4). The attributes of the change programme refer to its content and focus, facilitation, timing, educational interventions and mode of delivery (see box 3.2).

This research uses a multifaceted change programme to influence health professional behaviour and practice in a middle-income setting. It aims to explore and understand the processes and interactions that determine whether change is likely to occur; isolating these critical factors might usefully define simple rules for change that can be applied to future change efforts in similar environments.

4.2 Objectives

Purpose

To use a focused change programme to determine the influence of critical factors and key attributes on the diffusion of knowledge into changed health provider behaviour in a middle-income setting.

Objectives

1. To design a multifaceted change programme to influence midwifery practice in a middle-income setting.

2. To explore the influence of the attributes of the change programme on decisions to change practice.

3. To evaluate the impact of the change programme on provider behaviour.

4. To explore and understand the critical factors that influence diffusion of knowledge into changed health provider behaviour.

The results presented in chapters 5, 6 and 7 follow this structure.

Research questions

1. Is a multi-faceted change programme that uses interventions based on organisational, behavioural and social theory able to effect change in obstetric practice after 6 months?

2. What are the social and individual processes associated with change in health professional behaviour and practice?

3. What is the contribution of complexity theory to implementing change in health professional behaviour?

4. Which study designs and methods are most appropriate for evaluating implementation research?

The research questions cut across objectives, and are addressed specifically in the discussion (chapter 8).

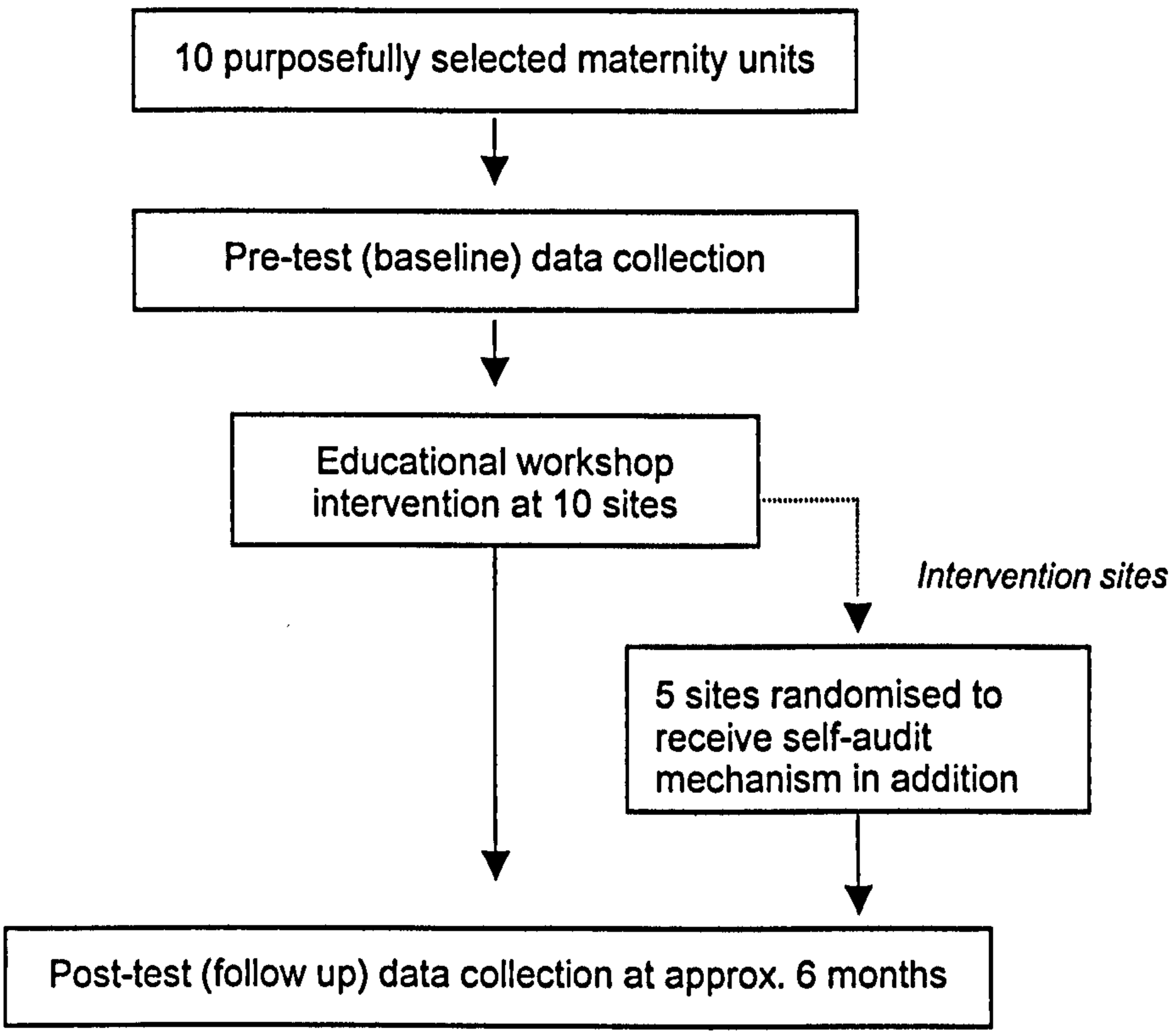
4.3 Study design

Initial protocol: A cluster-randomised design with matched pairs was attempted, with study sites (maternity units) as the unit of analysis. A cluster design is justified in implementation research since the interventions are usually delivered to clusters of individuals – at the level of organisation or geographical area rather than at the level of the patient. In these designs, the unit of intervention and analysis is the cluster. Cluster-based evaluation reduces the possibility of contamination between intervention groups. However, contamination plays a different role in implementation research, since the ability to change the behaviour of the cluster as a whole is usually regarded as a measure of success[2]. This group effect is important and may vary between clusters; and is one reason why analysis should take place at the cluster level (practice, hospital or organisational group)[3].

Time and funding limitations meant that it was feasible to conduct the study at ten maternity units only; the study can therefore be considered a 'pilot'. In preparation for a matched pair cluster design, ten study sites were purposefully selected from a list of government facilities in Gauteng province, South Africa[4]. Criteria for selection included facilities not more than 200kms distance from Johannesburg, and non-university affiliated status. The ten sites were then matched in pairs according to baseline characteristics (average deliveries, level of care, staffing and theatre facilities). Matching clusters in pairs with respect to baseline characteristics, prior to random allocation into control and intervention groups, can reduce variance between study groups and therefore increase the power of the study[2].

It proved difficult to find matching characteristics and create similar pairs in a sample of just ten units, so the analysis was by pre-post test design (see section 4.5 for a summary of changes to the analysis plan). Figure 4.2 illustrates the study design, which is similar to that used by Wyatt et al to enhance the use of systematic reviews in obstetric units in the UK[5].

Figure 4.2 One-group pretest-posttest design



4.4 Study sites and participants

The study was conducted in Gauteng province, South Africa. The map in figure 4.3 shows the location of South Africa, bordered by Botswana and Zimbabwe to the North, Swaziland and Mozambique to the East, and Namibia to the West. The map also depicts the boundaries of South Africa's nine administrative provinces; Gauteng province is bordered by North West, Limpopo, Mpumalanga, and Free State provinces. Figure 4.4 shows Gauteng province in detail; the three main cities in the province are Johannesburg, Soweto and Pretoria. Gauteng is the most industrialised province, and the economic hub of South Africa.

The 10 study units were selected from a list of all government facilities in Gauteng province[4]. Owing to time and cost restraints, only those within 200kms of Johannesburg were eligible for inclusion. Facilities with university affiliation (teaching hospitals) were excluded because it was assumed that health professionals in these hospitals might be more exposed to up to date evidence for different practices (via continuing education meetings, conferences, teaching), and more likely to be involved in medical trials of practice techniques; which could have a confounding effect on changing their behaviour.

The study sites represent hospitals of varying sizes, levels of care, staffing, facilities and locations. As table 4.1 indicates, level two hospitals are staffed by midwives, medical officers and specialists; they are district or referral units that accept complicated cases, often from large catchment areas. These hospitals have full theatre facilities, intensive care units, and are equipped to perform Caesarean deliveries. Level one hospitals are staffed by midwives and medical officers; some have limited theatre facilities and may perform Caesarean sections only at specified times, or when a doctor is available. Midwife only units (MOU's) are staffed exclusively by midwives, sometimes with a part-time or visiting specialist; these units provide a 24 hour service and usually have limited or no theatre facilities[6].

Four study sites served a mainly black population and were situated in peri-urban areas. Two of these hospitals (B and I) were located in previous townships, and two were in informal settlement areas with high unemployment (A and D). Two study sites (C and H) served a mainly white population, and were previously white-only hospitals located in mining towns. The remaining four study sites served all ethnic groups. One hospital (J) was located in a suburb of Johannesburg and three were outside the city – one in a farming town (G), and two in old mining towns (E and F).

Table 4.1 Study site characteristics by study group

Study site	Average deliveries /month	Level of care	Staffing	Theatre facilities	Population served
Intervention sites					
(A)	400	2	Midwives, doctors, specialists	Full	Low-income, mainly black
(B)	200	MOU	Midwives only	No	Low-income mainly black
(C)	150	1	Midwives, doctors	Limited	Low-middle income, mainly white
(D)	700	2	Midwives, doctors, specialists	Full	Low-income, mainly black
(E)	80	1	Midwives, doctors	Limited	Low-middle income, all groups
Control sites					
(F)	200	1	Midwives, doctors	Full	Low-middle income, all groups
(G)	100	1	Midwives, doctors	Full	Low income all groups
(H)	80	1	Midwives, doctors	Limited	Low-middle income, mainly white
(I)	870	2	Midwives, doctors, specialists	Full	Low-income, mainly black
(J)	130	MOU	Midwives only	Limited	Low-income, all groups

Seven of the study sites were maternity units that had not previously been exposed to training in evidence-based practice; but staff at two control sites (I, J) and two intervention sites (A, B) had participated in a previous trial to promote support during labour[7]. However, this study uses a different approach to changing health professional practice and targets several obstetric practices in addition to support during labour. No study site was excluded after randomisation and all but one control site (H) participated in the workshop intervention. The superintendent at this maternity unit had agreed to participate in the project, but was unavailable during the study period; subsequently the workshop and qualitative data collection did not take place. This hospital was in the quantitative before and after data analysis.

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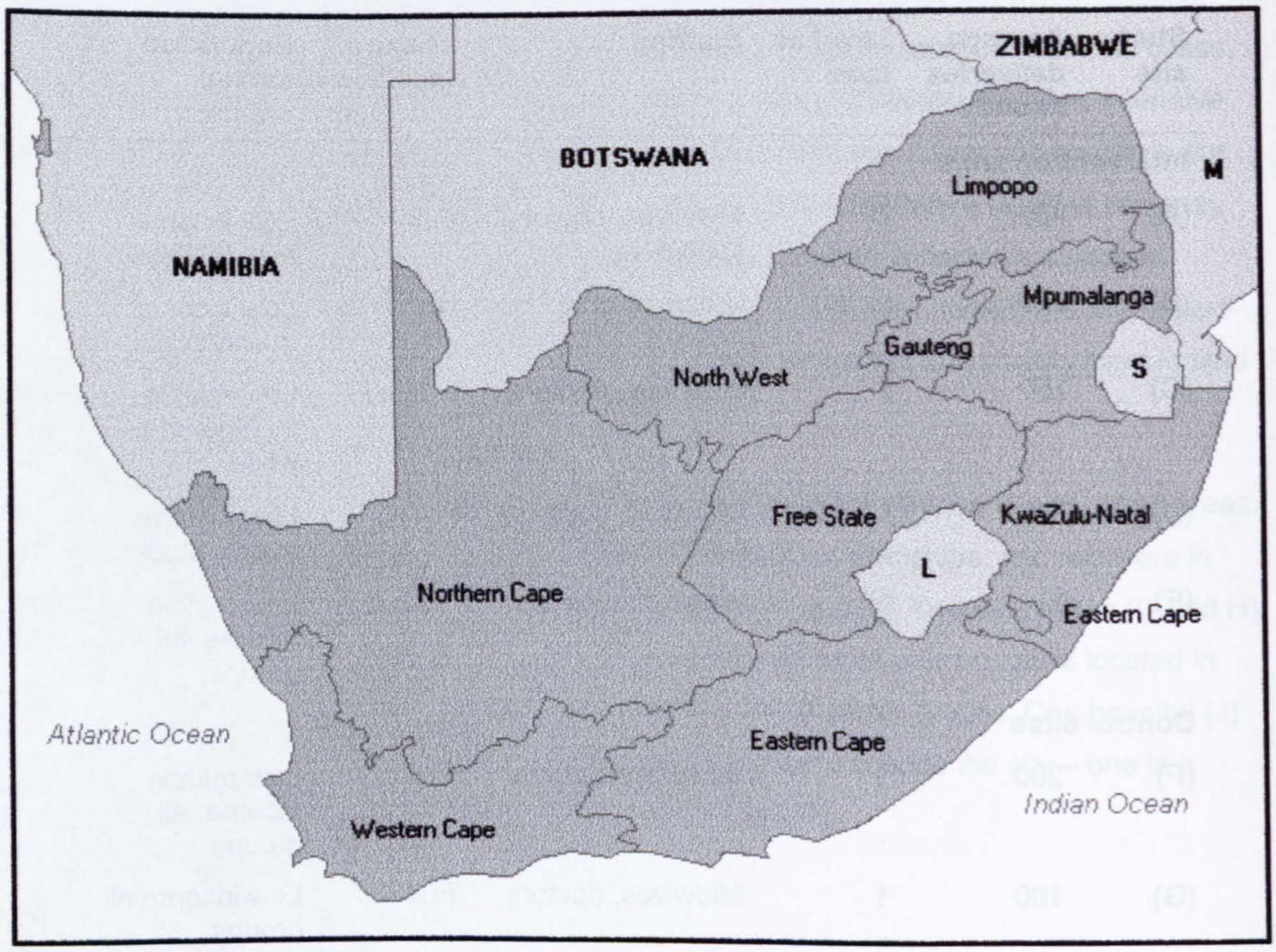
Figure 4.3 Map of South Africa and its nine administrative provinces[i]



[i] Flags of the world. Provinces of South Africa. http://www.fotw.ca/flags/za_.html. Accessed 22 Oct 2002.

Figure 4.4 Map of Gauteng province, South Africa[ii]

[ii] Visa International Service Association. Visa destinations. http://www.virtualconcepts.co.za/secure/visa/gtnmap.htm. Accessed 22 Oct 2002.

4.5 Data collection and sampling methods

This is a pilot study, using only ten study sites; the effect of the intervention on practice or the magnitude of difference within and between clusters to detect during follow-up was not predictable, therefore sample size calculation was not carried out. Table 4.2 shows the data collection methods used, participants and data collected, and table 4.3 shows sample sizes for each method. Details of data collection procedures are outlined below, together with justification for the methods used.

Table 4.2 Data collection methods, participants and data collected

Method	Participants	Data collected
Exit interviews*	Postnatal women	Rates for marker practices.
Focus group discussion*	Labour ward staff	Group experiences of the change programme. Changes to practice. Evaluation of the workshop and materials.
In-depth interview*	Labour ward staff	Individual experiences of the change programme. Changes to practice. Views about factors preventing and facilitating change. Evaluation of the workshop and materials.

* See Annex 6 for copies of interview schedules and topic guides

Table 4.3 Data collection methods and sample size

Data collection method	Participants	Sample size	Total sample size
Baseline exit interview	Postnatal women	30 per site	300
Follow-up exit interview	Postnatal women	30 per site	300
Focus group discussion	Labour ward staff	1 per site	8*
In-depth interview	Labour ward staff	1-2 per site	14

* At hospital I the focus group discussion was not conducted due to the superintendent's absence; and at hospital H neither workshop nor focus group discussion were conducted.

Exit interviews

Exit interviews with postnatal women were used at baseline and follow-up to document rates of use for the seven marker practices (enemas, shaving, episiotomy, oral fluids, position for delivery, mobility and companionship during labour). The time and resources available determined sample size for exit interviews; it was estimated that it would be feasible to conduct 30 exit interviews with postnatal women per study site at baseline and follow-up (see table 4.3). A retired research midwife conducted interviews at the bedside, in the woman's local language. The interviews used a structured format, and answers were recorded directly onto the interview schedule.

Baseline data were collected from September-October 2000. The educational intervention was conducted at all sites from October -November 2000; self-audit was introduced alongside the workshop at the intervention sites over the same period. Follow-up data were collected from March to April 2001.

Focus group discussions

Focus group discussions with labour ward staff who had attended the workshop prompted discussion around how practice changes (if any) had been implemented, the group's experiences of the change programme, and what they thought about the educational workshop and materials.

One focus group discussion was conducted at each study site. Convenience sampling was used to select participants for focus group discussions; participants were ward staff who had attended the initial workshop and were available on the day (see table 4.3). High staff turnover and staff shortages precluded a more representative sample. Groups comprised between 2 and 14 participants; a combination of midwives and doctors who worked together on the labour ward. At level one and midwife only maternity units, group size was smaller since there were fewer staff on duty. Focus group discussions took place in the labour ward, or a quiet room off the ward if available, and were tape recorded with participant's permission. An educational consultant with experience in qualitative methods facilitated group discussions (in English).

In depth interviews

Individual experiences of the change programme, changes to practice, and barriers to implementing change were explored using in-depth interviews with key labour ward staff at each site; participants were also asked to evaluate the educational workshop and materials (see table 4.2).

One or two key labour ward staff at each study site were purposively selected for in-depth interview (see table 4.3). Those who had attended the workshop and/or taken a leading role in promoting the evidence and implementing change in the labour ward were eligible for interview; it was assumed that these staff members would better articulate their experiences of the change programme and barriers to implementing the evidence in practice. The principal investigator[iii] (a social scientist) conducted the in-depth interviews in English using a semi-structured topic guide. Interviews were conducted in quiet rooms adjacent to labour ward, and were tape recorded with participants' permission.

Table 4.4 provides background information about the 14 interview respondents. All respondents were female, of varying age groups. Most respondents were midwives, qualified with a Diploma in midwifery; five were nurses qualified in general nursing, three of whom had a Diploma in midwifery in addition. One respondent was a senior medical officer.

[iii] Where principal investigator is used, this should be taken to mean the PhD student.

Table 4.4 Characteristics of interview respondents

Study site	Sex	Age group	Position	Qualifications	Years worked at the hospital
(A)	F	41-50	Midwife	Advanced midwifery	7+
	F	36-40	Senior medical officer	MBCHb	1-2
(B)	F	51-60	Midwife	Dip Community Nursing	7+
	F	41-50	Midwife	Dip Midwifery	1-2
(C)	F	36-40	Midwife	Dip Midwifery	7+
(D)	F	41-50	Matron	Dip Midwifery	7+
(E)	F	31-35	Midwife	Dip Midwifery	3-5
(F)	F	51-60	Matron	Advanced midwifery	7+
(G)	F	36-40	Midwife	Dip Midwifery	7+
	F	36-40	CPN	Dip Nursing	6-7
(I)	F	36-40	CPN	Dip Nursing & Midwifery	6-7
	F	36-40	SPN	Dip Nursing	1-2
(J)	F	51-60	CPN	Dip Nursing & Midwifery	1-2
	F	51-60	CPN	Dip Nursing & Midwifery	1-2

Note: CPN = Chief Professional Nurse, SPN = Senior Professional Nurse

Justification of methods

Exit Interviews provide a quick and accurate method for obtaining an estimate of current practice for commonly used procedures (marker practices). The structured interview schedule comprised closed ended questions with a fixed choice of responses; questions were asked in a standardised manner. An advantage of conducting exit interviews with postnatal women prior to discharge is that women's recall of the childbirth experience and interventions used is maximised. Conducting interviews at a later stage, outside the hospital environment, might have reduced the likelihood of courtesy bias, but level of recall would be lower.

Focus group discussions capitalise on interaction and communication between participants to generate meaningful data on experiences, feelings and general opinions. This was deemed the best method to obtain information about practice changes following the workshop intervention, and staff experiences of the change programme. All participants in focus group discussions were familiar with each other, and worked together in the same labour ward; this facilitated interaction and allowed participants to relate their comments to the actual working environment. Data collected using focus group discussions do not necessarily reflect natural everyday interactions or behaviours, but group interaction can encourage people to discuss general feelings and experiences, and can yield contributions from those intimidated by one to one interviews[8].

In-depth interviews provide the opportunity to explore issues in detail, and uncover new ideas or experiences not anticipated at the outset. However, the validity and relevance of data collected depends almost entirely on the interviewer's skill and technique. The topic guide included a list of core open-ended questions relating to the research objectives, and several sub-questions to help the interviewer probe for more detail and to clarify the meaning of interviewee's responses. A potential source of bias in the in-depth interview data is the personal characteristics of the interviewer; being an outsider, and unfamiliar to the interviewees, the answers given might not correspond with what participants actually think or do. This is a risk inherent in any research involving qualitative methods[8].

Using combined methods

Health services research, particularly implementation research, is increasingly asking more complex questions; for example, what works, for who, and why? Randomised controlled trials are considered the 'gold standard' for studying the effects of interventions, but applying this methodology to evaluate technology or behavioural interventions has required development of methods; the use of cluster analysis is one such development[9]. Furthermore, to address issues other than effectiveness, and to answer more complicated questions like 'why does this strategy work?', 'how does it work?', and 'which processes are involved?', requires qualitative research.

Qualitative research is often distinguished from quantitative research by its epistemological stance. For example, the nature of quantitative research is derived from the positivist paradigm and natural science practices; it focuses on observed facts, and aims to find general laws to predict behaviour. In contrast, the intellectual underpinnings of qualitative research include phenomenology, naturalism and verstehen[10 8]. Husserl's concept of bracketing preconceptions, the naturalists' view that strives to remain true to the nature of the phenomenon being studied, and Weber's theories of understanding have all influenced the development of qualitative research over the last century. These influences have culminated in an approach that is concerned with 'seeing through the eyes of the people being studied'[10]. Other dimensions on which quantitative and qualitative research approaches diverge include: the nature of the data collected, relationship between researcher and subject, research strategy and the relationship between theory and research[10].

The continual comparison of qualitative with quantitative research, and the tendency to view the two traditions as reflecting different paradigms[11], has led to an exaggeration of the differences between them. Qualitative research has frequently been regarded as the inferior or 'soft' alternative to the rigid scientific methods of the quantitative approach. More recent writers on research methods in health care claim that the quantitative-qualitative divide is overstated, and that the choice of research method is as likely to be dependent on the research question and technical considerations as the researcher's theoretical standpoint[10]. For instance, Ong suggests that the quantitative-qualitative divide is a 'smokescreen' because in reality researchers rarely conform to pure methods[12]; Brannen also shares this viewpoint[13]. There is growing recognition of the benefits of using quantitative and qualitative methods together, especially in health services research, which tends to be multi-disciplinary[14].

Over the last two decades, health related research has demonstrated that qualitative and quantitative approaches can complement each other – when qualitative research is used as a preliminary to quantitative research, when used alongside quantitative research, and when used independently of quantitative methods. In implementation research, qualitative research is commonly used alongside quantitative approaches, since qualitative methods can greatly enhance the scope and depth of data collected[15]. In-depth interviews and focus group discussions can appropriately address questions about process, for which traditional randomised trials are ill equipped[14]. Employing more than one method and therefore more than one type of data is a common interpretation of triangulation, or as Denzin suggests, using 'multiple observers, theoretical perspectives, sources of data and methodologies'[16]. The validity of a study's conclusions is enhanced if the data and findings derived from one approach are qualified by another. Qualitative methods can provide explanations for the impact or otherwise of an intervention, and facilitate the interpretation of patterns or relationships identified by quantitative data.

In this research, quantitative methods were useful for documenting change in practice rates, but qualitative methods were used as an adjunct to explore the trends identified: how change in behaviour and practice actually happened; what processes were involved; and which factors facilitated change. Augmenting quantitative research with qualitative methods enabled a more complete account of how different factors interacted to influence the diffusion of knowledge into changed behaviour and clinical practice. Each approach was used in a self-contained way, with attention to their varying assumptions. Quantitative data and narrative (qualitative) findings were analysed independently, since they sought to answer different questions; but in a secondary analysis the extent of change (quantitative measure) was integrated with qualitative information about processes and factors involved in changing behaviour to illuminate the dimensions of change.

4.6 Data processing and analysis

Changes to the analysis plan

It proved difficult to find matching characteristics and create distinct pairs in this fixed sample size of ten units; matching was attempted, but did not produce similar pairs. The variance in number of deliveries, staffing and facilities within the pairs was too great for the pairs to be considered similar. In hindsight, pairs could have been matched on baseline practice rates associated with marker practices (i.e. related to outcomes). However, baseline data was only analysed rigorously after the study, which precluded use of the results in the design. In addition, selection of study sites was restricted to those within 200kms of Johannesburg (to make best use of time and resources), therefore it was not possible to identify and randomly select relevant pairs from the whole list of maternity units in Gauteng; this may have enabled more accurate matching.

Attempted matching was ignored, and a one-group pretest-posttest design was used (see figure 4.2)[17]. Pre-test observations were made at all ten sites, the educational intervention was delivered to all sites, and post-test observations made. An addition to this design was the random allocation of five sites to receive the self-audit mechanism (intervention sites); a colleague not directly involved in data collection or analysis randomly allocated the sites by the toss of a coin.

There are two limitations to this design: a) using a small number of clusters (5 in each group) could result in imbalances between study groups by chance; and b) using a one-group design to compare two different interventions (educational workshop and educational workshop plus self-audit) will not provide information about the effect of either intervention against control. Multiple arm or factorial designs are more applicable, but are more complex and expensive to operationalise[18]. With limited resources available for this pilot study, the one-group design provided an alternative that allowed an estimate of the effectiveness of the strategy. The one-group design has weaknesses that lead to competing explanations for identified changes from baseline to follow-up (see Annex 7)[17]; but a strength of this study is the use of qualitative methods alongside the one-group design, to explore further the trends identified in pre- and post-test data.

Quantitative data analysis

Data from exit interviews were double entered and processed using Epi Info[19], and analysed using Epi Info and Stats Direct software.[20]

Because the maternity unit was the unit of allocation, and the intervention was implemented at this level, data were also analysed at the maternity unit (cluster) level. It was difficult to estimate variance between the clusters based on characteristics of the units at baseline, but confidence intervals were calculated at analysis.

Evidence-based standards used throughout the analysis are based on evidence from systematic reviews outlined in section 3.2 (chapter 3). The marker practices were categorised into those that improve quality of care and should be encouraged, and those that are harmful and should be avoided. For practices that should be encouraged, the analysis aimed to find an increase in use; and for harmful practices, the intention was a decrease in use. For analysis purposes, the practice rates used are based on sensible groupings given the upper and lower limits identified in this study. Table 4.5 shows the categories of evidence based standards and practice rate groupings used in the analysis.

Table 4.5 Categories of evidence based standards used in the analysis

Category of use	Practice	Practice rate
Improve quality of care, should be encouraged	Companionship during labour	Routine >60%
	Oral fluids during labour	Moderate 20-60%
	Mobility during labour	Low <20%
Harmful, should be avoided	Routine enemas	Routine >60%
	Routine perineal shaving on admission	Moderate 20-60%
	Routine episiotomy	Low <20%
	Supine position for delivery	

Analysis process

Analysis of quantitative data regarding the impact of the change programme on provider behaviour (objective 2) used the following process; the results presented in chapter 5 follow this structure:

1. **Change in practice from baseline:** In the analysis, the matched pair design was ignored (since it failed to generate similar pairs (section 4.3)), and the data were considered as aggregated into groups - 5 intervention sites (educational workshop plus self-audit mechanism) and 5 control sites (educational workshop alone). Differences in practice rates between intervention and control groups at baseline and follow-up were examined using percentage rates (see tables A3.1-A3.7, Annex 3). Changes from baseline were calculated for each practice using relative risk (RR – 1), and 95% confidence intervals were calculated using variance in practice at baseline and follow up and standard errors (see Annex 3 for formulae used to calculate relative risk and confidence intervals). Fisher's exact test was used to determine significant differences between baseline and follow-up measures (see Annex 3).

The Mann Whitney U Test was used to determine the median difference in practice rates between intervention and control groups at baseline and follow-up. The null hypothesis for this test was that the intervention group does not tend to yield different practice rates to the control group. When no significant difference was found between intervention and control units at follow-up, the ten study sites were analysed as independent cases to determine the general effect of the educational workshop intervention and trends in provider behaviour change. It proved difficult to determine the effect of the workshop and the self-audit independently as neither was compared to a control group alone.

2. **Practice compared to evidence-based standards:** Using the pre-defined categories of evidence-based standards (table 4.3), practice at baseline and follow-up was then compared to the available evidence to determine changes between practice and available evidence across all ten sites. A summary of good practice across the study sites was then constructed, and Fisher's exact test used to determine significant differences between baseline and follow-up. The null hypothesis for the test was that there is no difference between the number of hospitals demonstrating good practice at baseline and follow-up.

3. **Variation in provider behaviour:** The final stage of analysis examined variation in provider behaviour across the ten study sites. A summary of changes from baseline to follow-up by study site and marker practice was constructed to determine the extent of change at each site. Classification of study sites according to the extent of change in provider behaviour facilitated qualitative analysis of change processes at hospitals where many changes were implemented (see qualitative analysis process below).

Qualitative data analysis

Focus group discussions and in-depth interviews were analysed manually using principles of grounded theory[21] and the framework approach[22 23]. Transcripts were coded and managed using WinMax, a qualitative data analysis software package[24].

Framework approach

The framework approach was developed in the UK specifically for applied policy research. The Qualitative Research Unit at the National Centre for Social Research, London has refined the approach[22], but the general principles remain applicable to a range of applied research studies. In applied qualitative research, the objectives are typically set in advance (often dependent on specific information requirements of the client), rather than emerging from a more reflexive process[8]. The analysis process is therefore often regarded as deductive, that is, themes and categories for analysis are derived primarily from a priori issues and study objectives. While this detracts from traditional inductive approaches common to qualitative research, deductive forms of analysis are increasingly being used in multi-disciplinary qualitative research[8]. The framework approach typically comprises five key stages of analysis, listed in box 4.1.

Box 4.1 Five stages of data analysis using the framework approach

Familiarisation	Immersion in the raw data; listening to tapes, reading through transcripts, studying notes, to get a feel for the data and emerging themes.
Identifying a thematic framework	The process of identifying all key themes and concepts by which the data can be coded and referenced. The end product is a comprehensive coding index.
Indexing	Applying the thematic framework to all transcripts systematically; annotating the textual data with codes from the index.
Charting	The process of developing individual matrices for each key theme, and entering coded sections of text (plus identifiers) into appropriate charts.
Mapping and interpretation	Using the charts to map the range and nature of responses, create typologies, identify associations between themes, and attempt explanations.

Adapted from: Ritchie & Spencer[22] and Pope and Mays[8]

In this study the objectives of the qualitative component were made explicit at the beginning of the research; and the framework approach was considered an appropriate method of analysis. However, in order to uphold the basic principles of more 'traditional' qualitative data analysis, inductive methods of grounded theory were used alongside the framework approach. Therefore during the thematic framework stage, analytical categories were derived inductively from recurrent issues that emerged from the data, in addition to a priori issues identified from topic guides. Additionally, during the indexing phase, constant comparison helped to identify all data relevant to each category, and subsequently refine and merge categories into key themes.

Analysis process used in this study

The principal investigator worked through the following process to analyse qualitative data derived from focus group discussions and in-depth interviews. Although presented as a systematic process, defining categories and themes was an iterative process, and involved many cycles of constant comparison. Similarly, mapping the breadth and depth of the narrative data and interpreting the findings were lengthy, iterative procedures. Qualitative findings presented in chapters 6 and 7 were derived from this process.

Primary analysis

1. Focus group discussion and interview data were transcribed from tape recordings into computer based text files by the principal investigator. Individual text files were imported into WinMax software, where a directory of texts was established.

2. The principal investigator read and re-read individual transcripts and made notes about possible themes and ideas emerging from the data.

3. A thematic framework was constructed using a priori issues from original topic guides. In this study the key areas of questioning in focus groups and interviews included: perceptions of evidence based obstetrics and the need to update practice; group and individual experiences of changing practice; barriers and facilitators of change; and evaluation of the change programme and associated materials.

4. This initial framework was applied to the transcripts, and refined in response to emergent issues raised by respondents (using inductive, open coding). Key themes that emerged from in-depth interview data included: factors relating to individual experiences of the change programme; individual processes of change (reactions, deciding to change, attempting change); and attributes of the change programme (how it was delivered, content). Focus group discussion data revealed insights into group experiences of the programme; social processes of change (communication, social interaction, context of change); and issues around using the self-audit mechanism. Existing behavioural and social psychology theories also informed the analytical themes.

   A priori areas of questioning, and emergent and recurrent issues were then integrated to produce a detailed coding index (see section A4.2, Annex 4). A list of codes was entered in WinMax in preparation for indexing.

5. The principal investigator applied the complete coding index to all transcripts using the code function in WinMax. Coded texts were saved in the software package, and are easily retrieved for verification.

6. The code and retrieve function in WinMax facilitated retrieval of coded text by major theme or sub-theme. Matrices were then devised for each major theme and data copied from the coded transcripts in WinMax and entered into the charts according to the appropriate theme. Data from in-depth interviews were triangulated with findings from focus group discussions. Matrices are documented in Annex 5.

   In each matrix, study sites were grouped according to the extent of changes to practice (derived from quantitative analysis of practice rates). This facilitated secondary analysis and comparison between study sites where the change programme appeared successful, and those where it had little impact.

7. Data were interpreted by comparing and contrasting responses and experiences from the different study sites across the major themes. Attempts were made to accommodate deviant, or outlying cases throughout the interpretation phase.

Secondary analysis

8. Triangulation of quantitative data that classified study sites according to the extent of provider behaviour change, with narrative findings about how change was implemented at each hospital, enabled a secondary analysis that explored the dimensions of change. Case studies were used to map out individual and social processes, and the context of behaviour change at each hospital, which were then explored in relation to the extent of change at each study site, which led to the creation of a typology of behaviour change (see chapter 6).

Data from in-depth interviews helped to map out important attributes of the change programme on behaviour change; the varying influence of the attributes is presented in chapter 7.

4.7 Quality assurance

Several measures were established to ensure the quality of data collection and analysis processes and implementation of the workshop intervention, and to maximise reliability of the data. Reliability refers to the consistency or dependability of the data; a reliable measurement is one that if repeated will give the same results a second time[1]. Reliability of quantitative methods (scales or indices) is relatively straightforward to establish, but some argue that the very nature of qualitative methods (especially the flexible approach used for in-depth interviewing) limits the extent to which reliability can be measured[25]. However, there is good reason to attempt to establish the reliability of the qualitative analysis process, if only to ensure that critics cannot argue the findings were based on the subjective judgement of one researcher[26]. For a discussion about the validity of the study design, see Annex 7.

Reliability of methods

- The educational workshop materials were pre- tested with medical and non-medical staff at the Reproductive Health Research Unit (RHRU), Chris Hani Baragwanath Hospital (not a study site). Comments on the content, format and applicability of the workshop and associated materials were sought. Modifications to language and format were made accordingly before the workshop was implemented.

- The workshops were conducted using the same materials and by the same facilitators at each study site. The workshops followed the same structure to enhance replicability.

- The appropriateness, content and wording of exit interview schedules, in-depth interview and focus group discussion topic guides was also tested with staff at a maternity unit not participating in the study.

- To enhance reliability of data collection, the same fieldworker (a retired midwife) conducted all exit interviews, and the principal investigator made regular site visits to ensure consistency in interviewing technique. Exit interviews were conducted in a standardised way, and using the same interview schedules at baseline and follow-up; thus reducing the likelihood of variance in the way data were collected.

- Quantitative data from exit interviews were double entered by the principle investigator to strengthen reliability of the data set.

Reliability of qualitative data collection and analysis

Various authors have proposed methods to assess the validity and reliability of qualitative research. Some suggest that criteria similar to that for quantitative research can be applied[27 28 29], while others maintain that assessments of rigour in qualitative research ought to consider the different nature and assumptions of the approach[30 31]. Respondent validation, transparency of analysis methods and triangulation are generally considered essential to ensuring reliability of qualitative research[28 32], and are therefore used to assess the approach used in this study.

- All in-depth interviews were conducted by the same social scientist, using standard topic guides. The interviewer used various probing questions with different participants to explore or clarify issues further.

- An educational consultant conducted all focus group discussions using the same topic guide; deviation from the guide was inevitable, to explore and clarify issues.

- **Respondent validation** refers to the process of comparing the investigators account of experiences or information obtained, with the accounts of those who have been interviewed or investigated. A common technique is to feed back key points at the end of a focus group discussion or interview, so that participants have an opportunity to modify or confirm that the researcher has a true account of what was said. Feedback during and at the end of focus group discussions was attempted in this study; in most group discussions the facilitator confirmed consensus opinions on a particular issue before moving on to the next topic.

- **Transparent analysis:** Qualitative analysis in this study used the framework approach – a systematic, comprehensive, and replicable process. Thematic frameworks, coding frames and coded text were developed and managed using the WinMax software package; all documents were saved and are retrievable. Independent coding of transcripts was not carried out in this study, but the principal investigator constructed matrices to explore the complete data set and identify a range of responses and possible explanations when interpreting the data. During analysis an attempt was made to search for and discuss responses or experiences that contradicted or contrasted with the emerging themes and explanations.

- **Triangulation:** The comparison of results from more than two methods is a way of ensuring comprehensiveness rather than a pure test of validity or reliability in qualitative research[28]. In-depth interviews and focus group discussions were used in this study to obtain information about provider experiences of the change programme and to explore the individual and social processes that enabled change to happen. Contrasting findings from interviews and focus group discussions allowed patterns of convergence to emerge and enabled a more thorough analysis and interpretation of the data. Triangulation of qualitative data with quantitative measures of change in practice rates also allowed a more complete account of how different factors interact to influence behaviour at study sites where change in clinical practice was extensive.

Ethical approval

The Committee for Research on Human Subjects, University of Witwatersrand and the Ethics Committee, Liverpool School of Tropical Medicine approved the study.

Superintendents at all study sites gave permission for the project to be conducted. We sought individual consent before all interviews and group discussions with women and providers.

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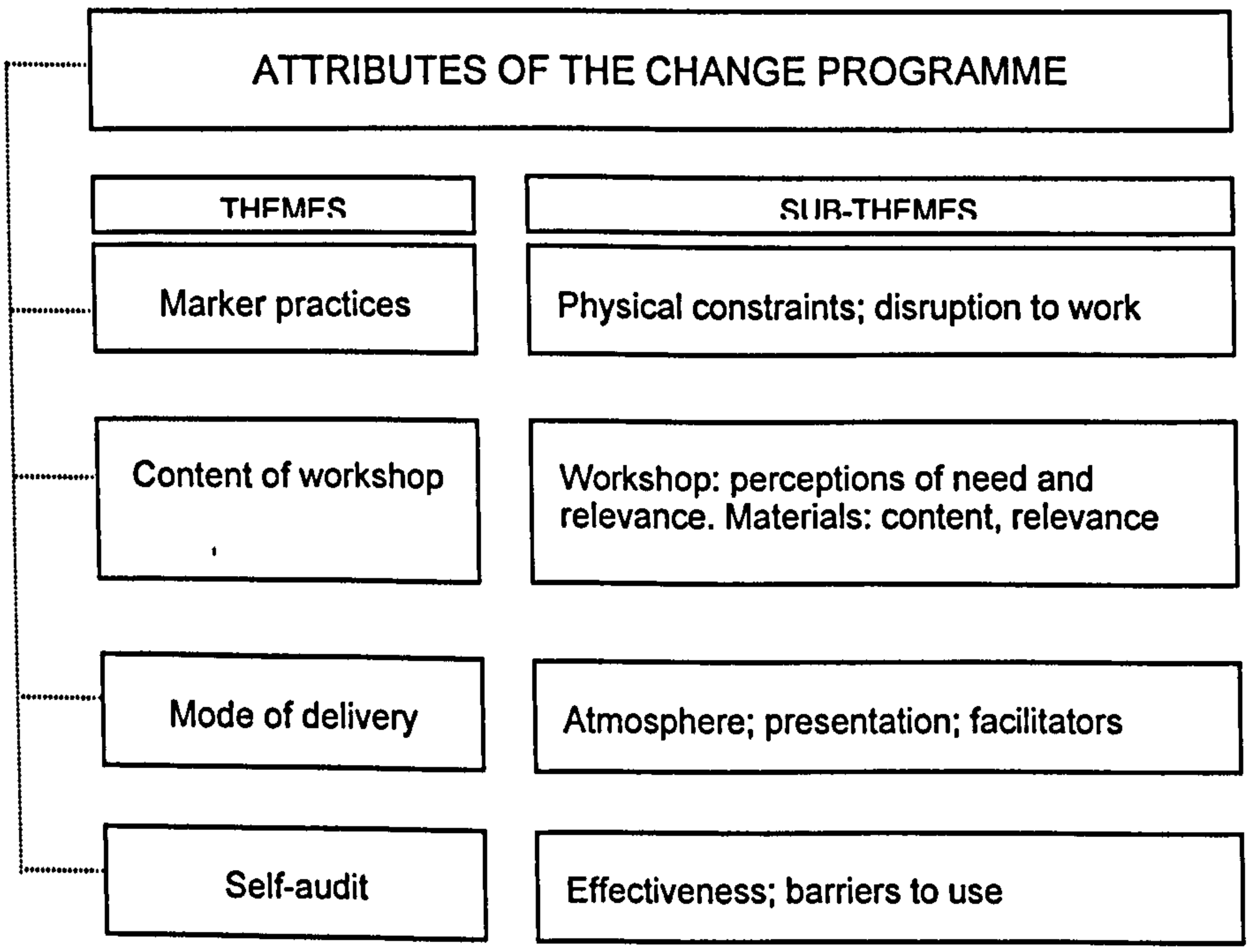
Chapter 5 The influence of change programme attributes

5.1 Introduction

This chapter explores the influence of the attributes of the change programme on decisions to change practice (objective 2, section 4.2). During primary analysis of focus group and in-depth interview data, particular themes became apparent, and further analysis identified a series of sub-themes. Thematic frameworks were used to develop a coding index, which was applied to the complete narrative data set. Matrices were then constructed to organise the coded data by theme and study site, and to aid interpretation (section 4.5). Analysis was also informed by the literature around characteristics of interventions to change health professional behaviour (see section 3.4, chapter 3). The themes and sub-themes identified by this process are illustrated in figure 5.1; each theme is explored in detail in the following sections. The findings presented in this chapter are derived, and use illustrative quotes from, the matrices documented in Annex 5.

Figure 5.1 Attributes of the change programme: themes and associated sub-themes identified during analysis.



5.2 Marker practices

Central to this research are the marker practices that the change programme intended to influence. These are practices where there is good evidence, from systematic reviews, of benefits and harms and where changes to practice will benefit women (section 3.2, chapter 3).

Primary analysis of the qualitative data indicates that certain characteristics of these practices appear to have an important influence on whether or not providers decided to change their practice. For example, midwives and doctors described the difficulty in changing practice for companionship during labour and different positions for delivery; two procedures where practice did not change significantly across all study sites. In contrast, the use of enemas, episiotomy, shaving and mobility during labour changed as intended at most hospitals with little reference to constraints (see chapter 6 for impact on provider behaviour and practice changes).

The following narratives highlight the physical constraints providers suggested prevented them from encouraging companionship during labour and using different positions for delivery.

Physical constraints

Companionship during labour

Providers at one hospital frequently mentioned that the infrastructure of the hospital or lack of facilities prevented them from allowing companions to support women during labour. Comments often centred on the poor layout of the labour ward:

'Yes, the barriers, you know, it's the layout of the place. Our labour ward was built a long time ago, we didn't have this type of information...and now the geography does not, its not let's say, user friendly. I would like to bring the supportive system, but now because of the geography of the place those are the boundaries, that prevent us from doing what we want to do.' (Midwife, hospital B)

'We don't have a problem with it [companionship], but I think the problem that we have is with the space, because our labour ward has only two beds. And we won't be able to have somebody supporting the patient because at times you find we deliver on the two beds at the same time.' (FGD hospital B)

'We haven't started practising it [companionship] because of the space – the main issue is the space, and the privacy too.' (FGD hospital B)

Providers at other hospitals also commented on the lack of privacy afforded by the current situation on the labour ward, and how this prevented them allowing companions to accompany women. A doctor at hospital A described ardently the importance of adequate facilities for companionship to be implemented:

'I think it's a very important point. The facilities, if you don't have the facilities how can you say we can do these things? Basically we can check, we can't so that, the privacy, we don't have enough space, so we can't do anything now as a routine. Until we have been provided with the facilities we cannot prepare, we cannot say anything.' (FGD hospital A)

Midwives at the same hospital agreed that the lack of privacy precluded companions for women during labour:

'It would be this one of curtains, we don't have enough curtains. So in our labour ward it is the case that we have two beds in one room, so this one won't be having a husband and this one will, so it will infringe on the privacy of that one.' (Midwife, hospital A)

'It would be nice [to allow companionship], but we don't have the facilities. I think some patients from the private hospitals, they prefer to have the people with them, but here we have no such facilities. It has become a problem really, that for staff and patients there is no privacy.' (FGD hospital A)

'I think its important [companionship], but now its difficult for us because of the physical layout of the ward. There are four beds in a room...then just imagine having visitors for the four patients, and this one is now delivering, and the relatives are there. Just imagine this one pushing and screaming and then its not nice for the patient having other people there.' (FGD hospital G)

Different positions for delivery

Lack of facilities was also a common reason why positions other than supine were not promoted at the study sites. Across all hospitals, providers recognised that old style beds were inadequate and described this as a constraint; the following narratives illustrate typical comments:

'Yes, the only thing that is lacking is the position of the mothers giving birth...that time you suggested that squatting is an easier method, its still not used. Mainly because of the situation on the labour ward, maybe we don't have big enough beds to accommodate squatting.' (Midwife, hospital J)

'I remember the positions for women. Our beds are not adequate, they are the old style so we cannot do this in practice.' (FGD hospital A)

'...that was the other issue, that was discussed [women's position during delivery], but we haven't done that because don't have the capacity to let the patients sit in the upright position. They are still all now on their backs in supine and they deliver that way.' (FGD hospital G)

'The single most important thing that I think has not changed yet is the position of delivery. And that will only change if we get these wedges [for the beds]. Because there is no way that anyone is going to delivery a baby on the floor, squatting or whatever...so semi-upright would be perfect. It's still comfortable for the doctor or sister doing delivery, and it's comfortable for the patient and safe. But we don't have the wedges...that's the main thing, that's the one main thing that's still a problem' (Doctor, hospital F)

In addition to inadequate facilities, some midwives were quite honest about their lack of experience delivering in more upright positions; this could explain why they were reluctant to try it out in practice:

'...squatting positions, well maybe if the woman feels comfortable. But we are not used to any position.' (FGD hospital G)

'We feel that the flat position is a good position for delivery. It's very much difficult to catch the baby when the woman is squatting on the floor.' (FGD hospital G)

'Only a few women want the squatting position, and its like women who have never delivered in a hospital, those ones do like to squat...we just deliver them, but its not easy. The babies come out in a funny position.' (FGD hospital E)

Disruption to work pattern

Another important factor identified during analysis and related to the feasibility of changing behaviour for the marker practices was midwives perceptions of the benefit of changing their practice. During group discussions, the conversation tended to focus on companionship; midwives explained how they thought that friends and relatives accompanying a woman in labour changed the interaction between the midwife and the woman, and disrupted their working routine. The following narratives illustrate typical comments:

'Some patients they prefer to always have somebody there, but some patients do not feel relaxed at all and the relationship between the staff and the patient changes. The patient now is, how can I put it?, is more seeking attention, unlike when we are only two and they would listen to me.' (FGD hospital F)

'...the patient becomes disrupted, like she seeks more attention to the companion, she no more listens to what I'm saying.' (FGD hospital F)

'...we find that in fact this companion thinks that you as the midwives, you are not doing enough. I don't know whether she thinks you should be caring, sitting with her...I don't know, but you can actually see she's sulking with you.' (FGD hospital J)

'No, I was actually negative to it [companionship], because you know, you don't feel comfortable, you don't do your work well if the place is full, you understand? So the relatives will come and tell you no, "this was not done", and "when are you going to do this?" They tell you what to do, so I chose not to accept it.' (FGD hospital G)

Midwives at one hospital even suggested that if the woman has a companion to support her, the midwife does not fulfil her role properly:

> 'It means the midwives are not doing their work. Because if the relatives are there, then they don't progress the patients very well, they don't do the PV's, or every 30 minutes or every hour the blood pressure should be taken and all those things. And they don't do it because now the relatives are there. And they are querying "what are you doing?"...and if you are chasing them out now to do a PV they say "why can't we stay?"....and you know, they are not only interested in their own family member, but they are interested in all the other people!.' (FGD hospital G)

> '...are they utilising that more time? Because while you are shaving a patient or giving a patient an enema...you are talking to the patient and telling them, "I'm giving you this enema and this is what is going to happen to you" and whatever. While you are busy with the procedure you are busy with the patient. But now when people are having more time, what are they doing? They go to the nurses counter or to the tea room and are starting with the bulletins or administrative work and they don't talk to their patients. The procedure brings you to the patients.' (FGD hospital G)

At other hospitals, providers suggested that potential companions should be trained in their role and know exactly what is expected of them:

'The companion should be the person who actually understands her role or his role...the companion should be enlightened as to what to expect, what are our expectations, what we expect from you, what is your role. We expect you to behave like this towards the patient, this is how you must help your patient. But now you find that the companion is actually panicky, more panicky than even the patient herself, when you expect her to be calm and be able to make the patient calm...I don't know how this is actually going to be done, but if this person could be trained, could be enlightened.' (FGD hospital J)

'The only thing is that most of them are there but they don't know what is expected of them as partners you see. So sometimes if they come in and they don't know we try and tell them this is what we expect from you.' (FGD hospital C)

'...another thing, they are imposing that they know better, "its not done that way", some such things. She has to know what are the procedures that are mainly done by the professionals, that they will not have any input on that.' (FGD hospital B)

5.3 Content of workshop

Another key attribute of the change programme is the workshop and its contents. Together with specially designed materials, this was the main vehicle used to convey information about evidence-based care and influence midwifery practice. Because the intervention was being used for the first time, we engaged providers in a critical evaluation of the workshop and associated materials. Sub-themes that emerged from in-depth interviews and focus group discussions related to midwives perceptions of the need for the workshop and its relevance to them, and the contents and relevance of the materials. It is possible that some or all of these factors influenced the uptake of the new information and consequent behaviour change. The following sections present findings according to the key sub-themes.

Relevance of the workshop

Qualitative data suggest that midwives and doctors perceived the workshop as relevant to them. A frequent comment was that the workshop was educational and provided appropriate information; the following narratives illustrate typical comments:

'The workshop was very educational, I learnt a lot. I liked the idea of not shaving patients and ...if the patient gives birth normally that is a thing I would like to see done all the time.' (Midwife, hospital J)

'Er, that workshop was very educative...yes, there are things that I had already forgotten, and things I didn't know for whatever reasons. By coming here and telling us what is supposed to be done, that's why I say it was very educative, I learnt a lot.' (FGD hospital J)

'For me it was a lot of relevant information...you really got new information that I think was helpful.' (Doctor, hospital A)

'Yes, you learn a lot, there is a lot of information, especially if you are working in labour ward.' (Midwife, hospital A)

At other hospitals providers also described the workshop as relevant to their practice; they mentioned specifically the need for workshops that inform providers what they should be doing in practice:

'To start with, there is nothing I didn't like about it. I liked it very much. And we are living in a dynamic world, we need this type of workshop because it is a scientific thing and is based on facts. So, er, if things are based on fact it is more or less you are on the right track, you are doing the right things...so this type of workshops are really crucial to the way we do things.' (Midwife, hospital B)

'Yes, I liked it. Let me say, it was a learning situation because we didn't know about some of the things. Yes, we were not aware of some of the things.' (Midwife, hospital I)

'Yes, I liked the content of the workshop because these are minor things, these are things that we can always do away with, we can deliver a patient having not undergone all these things.' (Midwife, hospital B)

'I think it was enjoyable, it taught us a lot. It showed us which things to change and which things we are on the right track with.' (Doctor, hospital F)

'I think the presentation was quite relevant, because you know, as we say these days we are practising evidence-based medicine, but you don't want to be doing something that you don't know whether it is based on evidence, or the book was written by somebody years ago. And you just continue because it is routinely done. Yes, the presentation was very good.' (Midwife, hospital J)

Some midwives even described the workshop as 'empowering', or 'eye opening', which illustrates the importance providers attached to the workshop, and the interest it generated:

'The workshop for me, it was an eye opener, because I became aware of certain things I was not quite aware of. To me it was an eye opener, yes.' (Midwife, hospital B)

'I liked the workshop, its like, its empowering. So I wish we could have something like this always.' (Midwife, hospital E)

At one hospital a midwife perceived the change programme as a research project and therefore concluded that it was less relevant to her:

'...I find er, I really, I don't know what was the aim to it all, what actually I think, or thought, that it is now Dr Brown or whoever who is doing now research and to do a thesis on er, other ways of delivering babies or whatever. And OK, it could have been to emphasise the patients right...' (FGD hospital G)

Perceived need for the workshop

Across all study sites providers perceived a need for the workshop, and during interviews midwives frequently discussed this in terms of the need to stay up to date and know what the latest research shows. The following narratives illustrate typical comments from the study sites:

'I personally feel there is a need, as I just stated, we need more of these workshops because there are new informations that are moving with the times, so we are not left behind.' (Midwife, hospital B)

'Yes, there is a need. We should know what is happening outside, we should not be left behind with old methods.' (Midwife, hospital I)

'Hmm, yes, that's why I say if you can give it very often, because we need the latest information and researches.' (Midwife, hospital J)

'Yes, there is, I felt there was really a need. You find there are so many changes going on over the years, and then you find that we are still here sticking to the old things that we are doing because its never been introduced.' (Midwife, hospital J)

'...especially dealing with the situation of daily in and out that most of us are situated in. Like if you are in maternity you stay there...it's the same people all week. So I think workshops and this new information and researches will help us, and the patients will benefit as well.' (Midwife, hospital J)

'Yes, definitely there was a need. And you know, I must say we have employed new sisters as well now, so we wouldn't mind if you would come again.' (Midwife, hospital C)

Relevance of the materials

The change programme included materials to accompany the discussion and presentations during the workshop; they were designed to help midwives and doctors challenge current practice and think about more evidence-based approaches to obstetric care (see section 3.4, chapter 3). During follow-up interviews and focus group discussions, we encouraged discussion around the relevance and usefulness of the workbook, reference booklet and posters. Providers generally found the design of the materials attractive, and the content easy to understand; many also felt the concise format was practical. The use of a traditional African design prompted various reactions; for some it was something to identify with, but others felt it exclusionary. It is possible that the design and content of the materials had an effect on the adoption and diffusion of new information from the change programme.

During interviews providers described the materials as clear and understandable, the following extracts illustrate typical responses:

'I liked them [the materials]. They were clear, easy to understand, bright attractive colours. In fact when you go into labour ward you are wondering what s this all about? I think its good...they attracted your attention.' (Medical officer, hospital A)

'Yes, everything was clear, everything was well explained in this [workbook]...even the posters, because everything was there, the drawings, whatever you explained.' (Midwife, hospital I)

'The workbook, it's informative and simple and straightforward. Its simple language that's used...and the information came out clear and it's readable.' (Midwife, hospital B)

Providers at other hospitals commented particularly on the desktop reference; the concise format of this reference booklet made it more appealing and good for communicating information to others:

'It's bright and colourful, and it takes the real essence, especially the calendar thing [desktop reference]. It takes the real essence, you know, that's important.' (Midwife, hospital F)

'I like them [the materials]. There is that one you can put on the table...so everyone can see and for transferring information it was good.' (Midwife, hospital G)

'They were user-friendly, bright. Like the calendar [desktop reference], this is one thing that you can read time and time again. You don't have to have a big book where you've got to read as if you're studying...so this one is just sketchy and user friendly and more attractive.' (Midwife, hospital D)

'I actually liked the one that's like a calendar, ya, because it's a reference, when you have a question you can just read one or two lines. Its very user friendly' (FGD hospital D)

During group discussions providers made general comments about the design of the materials and how they were appealing to the African community. Midwives at one hospital described it as African Renaissance:

'...its more of a black thing than a white according to these pictures. It makes me feel like it is for us, we can relate to it. '(FGD hospital B)

A colleague than added:

'Yes, we are now, somehow, we are now important as blacks. A renaissance! African Renaissance!' (FGD hospital B)

Midwives at another hospital also described the design of the materials as African Renaissance:

'The design...its African renaissance! Yes, it is so they are interested in it, and it's easy to read and so attractive...it's bright colours, makes you interested.' (FGD hospital D)

Providers at one hospital had different views, and suggested that the materials should be redesigned to appeal to a wider population. The midwives described an existing problem with the white population not attending antenatal care and were worried that the materials might give the impression the change programme was targeting obstetric care for black women only:

'Most of the white people are not undergoing antenatal here, that's our problem here....they only come for delivery and then immediately after they want to get out. Once the baby is out they just want to go home. They might think that black people are the only ones to get benefit from this [programme].' (FGD, hospital E)

5.4 Mode of delivery

It is possible that the way in which the workshop was delivered – as a small, informal and interactive group session – had an influence on provider behaviour, and enabled change to happen. The following narratives describe typical views about the way in which the workshop was conducted. At one hospital, during in-depth interviews the midwives talked a lot about the informal or relaxed atmosphere of the workshop, and suggested this was a good approach:

'...everyone contributed to it, it was enlightening and everybody just said what they wanted to say. It was a relaxed atmosphere...we were quite honest about everything including the things we were unable to do. We were free to say that we did not do it because you were not very authoritative.' (Midwife, hospital B)

'It's not like you have a stick and are saying "why haven't you done this?"...it is more of an understanding of how things change, not telling us. It's a modified way of saying, it's a nice way of saying "change" and "you can do without these things". And that is why we have even decided now that we are going to take some steps with some things, with the enemas.' (Midwife, hospital B)

'Because you really can say what is in your mind about the whole thing...everybody is just giving opinions, you are free to do that. No-one is going to harm or laugh at your spoken language, you see, so it's a good atmosphere.' (Midwife, hospital B)

During the group discussion at the same hospital, midwives described how the workshop was useful for sharing knowledge:

'...sometimes when we are here, you just do the things routinely and we don't share with other people from outside. I think its good to share knowledge with other people to improve.' (FGD hospital B)

At other hospitals, comments related to the presentation of information during the workshop:

'Ok, I think it was well presented. I understood almost everything you said, and we tried to implement everything. And it was more beneficial to us than any other thing. And we hope we can do most of those things you know, because most of us don't attend workshops, so we are not acquainted with the latest information and researches.' (Midwife, hospital J)

'It was very clear, I remember it was audio-visual and it used overheads.' (Midwife, hospital A)

'As we have just discussed, really we felt it was of good to have people coming to tell us and we realised the extra things we have been doing. Well, although change is difficult, but it didn't take us too much to compare what we are doing to the new ideas and agree. And again other people were there able to understand what was it about the workshop, we came together to share the information and came to a consensus.' (FGD hospital D)

An important aspect of communicating in a workshop situation is who actually delivers the information and how the recipients perceive the informer. The potential influence of Dr Brown (facilitator and local opinion leader) is discussed in chapter 7, but the presence of the second facilitator (the principle investigator, a white researcher from the UK), was not easily explored in this study.

5.5 Self-audit mechanism

The self-audit mechanism, introduced at five of the ten study sites, represents another important attribute of the change programme. Qualitative findings provide an insight into the potential influence of the audit on provider decisions to change practice. Sub-themes identified during the primary analysis relate to effectiveness of the audit as a motivating influence, and to the barriers that prevented staff from using the audit (see Annex 5); these are presented in the following sections.

Effectiveness

Three out of the five intervention sites used the self-audit (hospitals C, D and E). At hospital D, providers described how the audit had helped to motivate them; they found the visual representation of the use of procedures useful for judging their progress:

'We had that chart, whereby when we were starting they were recording how many patients were having enemas per day, how many do episiotomy...and as time goes on we realised that it was just as good not doing it.' (FGD, hospital D)

'OK, at first you know, when you bring change to people they don't just take it. They thought it was extra work of sitting down and charting, recording all that, but as they practised it they realised it was of good help.' (FGD, hospital D)

During an interview, one midwife described how the audit helped to communicate concepts from the workshop to other staff:

'Ja, it was very useful and it gave other people chance to practice...really it was giving everybody a chance to be involved. And those who were wondering what is the chart, we explain that OK, we attended a workshop and its how we are going to practice, instead of taking it and shoving on the shelves, it will reach many people.' (Midwife, hospital D)

At hospital C providers held similar views about the motivating influence of the audit mechanism:

'OK, that wasn't difficult because right at the beginning we sat down and we studied how do we do that. And in the long run it came out, it was very clear, I think because we came together and said lets give each other ideas, how do we want this thing done. Eventually we got it right, and it was not problematic, it was very clear.' (Midwife, hospital C)

'It was useful, like I said to you, you could see that in the beginning people were stagnant, you know, as to what they've learnt, but as time goes on people change their ideas, as you speak to all of them.' (Midwife, hospital C)

Midwives also described how the audit was useful for displaying changes to practice and highlighting progress over time:

'You know, for instance the posters she gave us, we must plot the number of patients we gave enemas, and the patients we did not give enemas. At the beginning everyone was giving enemas...and then as time went on the graph moved down, so less people were giving enemas, so they were quite useful.' (Midwife, hospital C)

'I must say that usually we used to do it as a routine thing, that you give enemas. But it has changed; you find that amongst 10 patients that you admit, only two got enemas, eight didn't get, so it has changed.' (FGD hospital C)

At this hospital staff were very enthusiastic about the benefit of the audit. A doctor even suggested that results from the audit be included in a monthly statistics at the hospital to keep track of changes to practice:

'...of course with this [audit] we can see how we are progressing , but can't you find another way, with the figures, some way of feeding back, giving you some figures, the statistics? Although these are already showing what we are doing, but maybe, so that we can compare, if we have some forms or some type of returns?' (FGD, hospital C)

'Maybe in our monthly statistics we can include the Better births with this, and see what we have done it will help.' (FGD, hospital C)

At hospital E, midwives also used the audit and explained how it had motivated them to change their practice for some procedures:

'It's helping, because you know, we really want to do what is on the chart. We want to follow the chart and we will succeed.' (Midwife, Hospital E)

'Yes, I think it was a useful thing, because since the workshop it has motivated us to do some of the things. Its right to have the chart.' (FGD, hospital E)

'The chart I think is useful because it motivates you – let's now do this delivery without episiotomy – it definitely helps you not to do it.' (FGD, hospital E)

Barriers to use

At some study sites providers perceived the self-audit as too much extra work, especially when staff shortages were the norm, and consequently did not use it (hospitals A and B). Others suggested that lack of support from the research team resulted in poor staff motivation to conduct the audit.

Staffing issues

At hospital A, providers explained how the burden of work and shortage of staff prevented them pursuing the self-audit:

'You know, I think it's a good idea when we are well staffed. Now it seems that one of the reasons we did not do particularly well is that we have so much to do, we just couldn't follow it up. There are so many patients, so few staff.' (Midwife, hospital A)

'It's just like, you do other things, there is so much to do. Research is actually a good thing if there is a lot of people doing it, then the other people concentrate on it, to follow it up. But here we have so much work to do. It is a good thing, but I don't know whether in our facilities we can really give you a clear picture. Or maybe it will highlight some of the problems, why it was not successful.' (Doctor, hospital A)

At hospital B, providers also perceived the audit to be extra work, which precluded use of the charts to plot changes to practice:

'Er, I think we normally say we are busy. And sometimes we are. And really we don't know how to attend other things except that which we are doing. You know, it was something extra on top of what we do ion the ward, so that is why I think we never started it.' (Midwife, hospital B)

One midwife openly admitted that a reason the audit was not used, was because the change programme was 'from outside'; thus implying that it was not taken as seriously as an 'internally driven' initiative.

'Ja, I thought it was something additional, extra work to do. And also its from outside, you know [laughing, embarrassed].' (Midwife, hospital B)

Lack of support

At hospitals where staff did not use the audit, lack of support from the research team was frequently mentioned as a constraint, and was associated with lack of motivation among providers to use the audit. At hospital A providers felt quite strongly that support from the research team had resulted in providers abandoning the self-audit:

'It was done in the beginning, but not for long. We didn't really know how to use it. Maybe if you had followed up sooner, there was lack of motivation.' (FGD, hospital A)

'...the basic thing is we didn't see the people who are doing the research. So, the people thought that maybe they weren't interested anymore...that was the main factor. If I was the research I would be regularly visiting day by day, but there is lack of interest from the researchers. The people here have other things to do, so you can forget it, I think that's the main thing.' (FGD, hospital A)

At hospital B, lack of motivation from labour ward staff together with poor follow-up prevented use of the self-audit:

'Er, no particular reason, but as I say, immediate motivation. Or maybe sometimes they [the staff] work better if there is someone in charge...and someone can tell the night nurses about the charts.' (Midwife, hospital B)

'I would say maybe from the outset if we had immediately put the chart there. We needed someone prodding us and saying "do that".' (Midwife, hospital B)

'Yes, or the alternative, what could have happened was, maybe sometimes if you could come and visit us and say "Hi people, are you still doing the chart?" and say please continue and maybe one or two phone calls to see' (Midwife, hospital B)

5.6 Summary

Box 5.1 Influence of change programme attributes

- The qualitative data indicate that attributes of the change programme had both positive and negative influences on the adoption and diffusion of information from the change programme, and provider decisions to change practice (all prerequisites for change).

- In this study behaviour change was clearly affected by perceptions of the element of risk associated with change. Different positions for delivery and companionship during labour were procedures that providers associated with physical constraints or disruption to existing work patterns (i.e. high-risk changes). In contrast, changing the use of enemas, episiotomy, shaving and mobility during labour was low-risk; changes were easily implemented with few references to constraints.

- The workshop was described as educational and empowering, and the informal environment provided the opportunity for interaction, discussion and sharing ideas about changing practice.

- Narrative data also suggest that presenting information in bright, attractive materials helped to effect changes to practice. The concise format of materials was appealing to busy health professionals and contributed to successful uptake of ideas.

- Where it was used, the audit appeared to motivate staff and help them communicate new ideas to colleagues. Staff shortages and lack of support were mentioned as barriers to use at hospitals where the audit was not utilised.

- Chapter 6 presents baseline and follow-up data for the marker practices and describes the impact of the change programme on provider behaviour.

Chapter 6 Impact of the change programme on provider behaviour

This chapter describes baseline and follow up data on provider behaviour (objective 3, section 4.2). The interventions were two fold; first, an educational workshop conducted at all ten hospitals; and second, an additional self audit mechanism tested at 5 randomly selected (intervention) sites (see section 4.5 for the analysis plan).

6.1 Change in practice from baseline

The first phase of analysis determined differences in practice rates at baseline and follow-up between hospitals that received the educational workshop and self-audit (intervention sites), and those that received the workshop alone (control sites). Percentage rates, calculated from raw exit interview data were examined (see tables A3.1-A3.7, Annex 3), and the Mann Whitney U Test was used to determine median differences between intervention and control groups at baseline and follow-up.

In tables 6.1 and 6.2, practices are categorised according to the evidence-based standards outlined in the analysis process, chapter 4. Table 6.1 shows differences in provider behaviour at baseline and follow-up for practices where an increase in use was intended, and table 6.2 shows provider behaviour for practices where a decrease was intended.

Table 6.1 Behaviour for practices where increase in use is intended: difference between intervention and control groups at baseline and follow up

	Rate of use (%)					
	Mobility		Oral fluids		Companionship	
Study site	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Intervention						
A	21.7	31.0	4.3	24.1	0.0	0.0
B	21.2	16.7	18.2	6.7	0.0	0.0
C	46.4	41.4	42.9	13.8	3.6	48.3
D	46.7	63.3	10.0	18.2	0.0	18.2
E	25.0	53.3	6.3	13.3	6.3	6.7
Control						
F	27.3	47.4	18.2	42.1	9.1	36.8
G	21.4	50.0	7.1	10.0	7.1	0.0
H	42.9	23.8	35.7	33.3	21.4	47.6
I	63.0	68.8	14.8	6.3	0.0	12.5
J	30.8	45.8	19.2	25.0	23.1	50.0
Median difference[1] (95% CI)	-5.6 (-38, 19.4)	-6 (-33.3, 17.6)	-4.8 (-25.7, 24.7)	-9.2 (-28.3, 11.9)	-9.1 (-23.1, 0)	-12.5 (-47.6, 18.2)

Note: [1] Mann Whitney U test. Source: Analysis of exit interview data (Annex 3)

Table 6.2 Behaviour for practices where decrease in use is intended: difference between intervention and control groups at baseline and follow up

	Rate of use (%)							
	Routine enema		Routine perineal shaving		Routine episiotomy		Supine position	
Study site	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Intervention								
A	47.8	6.9	13	0	39.1	31	100	100
B	69.7	63.3	3	0	24.2	16.7	100	100
C	64.3	13.8	10.7	3.4	35.7	27.6	100	100
D	50	4.5	3.3	4.5	33.3	9.1	100	100
E	0	0	0	6.7	0	13.3	100	100
Control								
F	4.5	0	4.5	0	27.3	31.6	100	100
G	50	40	64.3	10	28.6	20	100	90
H	71.4	57.1	67.9	9.5	39.3	23.8	100	95.2
I	3.7	0	0	6.3	18.5	6.3	100	100
J	30.8	16.7	11.5	6.3	15.4	45.8	96.2	95.8
Median difference[1] (95% CI)	17 (-30.8, 60.6)	0 (-50.2, 46.6)	-8.2 (-64.6, 8.5)	-3.3 (-9.5, 3.4)	5.7 (-27.3, 20.3)	-6.7 (-29.1, 11)	0 (0, 3.8)	4.2 (0, 10)

Note: [1] Mann Whitney U test Source: Analysis of exit interview data (Annex 3)

The results in tables 6.1 and 6.2 show that at follow-up there were differences between median practice rates at intervention and control groups for most practices (mobility, oral fluids, companionship, shaving, episiotomy and supine position). However, only supine position showed a significant difference (4.2; 95% CI: 0, 10).

One interpretation of these findings is that the self-audit mechanism did not have a significant additional effect on practice at sites that received it in addition to the educational workshop. To test this hypothesis more accurately requires a more rigorous design where the data are analysed in matched pairs and using a multi-arm trial where the educational workshop and the audit can each be compared to a control. Given the limitations of the current study design, it seems more logical to determine the impact of the educational workshop (implemented at all sites) by examining the evidence for change in practice across all study sites.

6.2 Practice compared to evidence-based standards

The Mann Whitney U test (above) found no difference between the intervention and control groups at follow-up, so the study sites were then analysed as independent cases to determine the general impact of the educational workshop on provider behaviour across the ten hospitals, and trends in behaviour change (see analysis plan, section 4.5).

Using the evidence-based standards and practice rates defined in chapter 4, behaviour at each site at baseline and follow-up was compared to the available evidence. Table 6.3 summarises behaviour compared to evidence-based standards at baseline, and table 6.4 shows the comparison at follow-up.

Behaviour at baseline

For practices that should be encouraged, behaviour at baseline was more likely to reflect moderate or low practice rates. Mobility was used routinely at just one hospital, but moderately at nine hospitals. Oral fluids were not used routinely at any hospital, and eight hospitals had low rates of use. Companionship was used moderately at two hospitals and eight had low rates of use.

For procedures where the evidence suggests they should be avoided, behaviour varied between study sites. Enemas were used routinely at three hospitals, moderately at four, and three had a low rate of use. Behaviour regarding use of perineal shaving generally reflected low practice rates (eight hospitals), but shaving was routine at two hospitals. Episiotomy was used moderately at seven hospitals, and three had low rates of use. Supine position was routine practice at all ten sites (table 6.3).

Behaviour at follow-up

For practices that should be routine, some changes to hospital behaviour were evident at follow-up. Two hospitals demonstrated routine practice for mobility, and seven had moderate rates of use. Four hospitals showed moderate practice rates for oral fluids and companionship; an improvement from baseline behaviour.

For some procedures that should be avoided, hospital behaviour was more consistent with the evidence at follow-up. Seven hospitals demonstrated low rates of use for enemas, and at all ten hospitals behaviour reflected low practice rates for perineal shaving. However, hospital behaviour regarding episiotomy and supine position had changed little at follow-up (table 6.4).

Table 6.3 Hospital behaviour compared with evidence-based standards at baseline

	Number of hospitals (n/10)		
Standard	**Routine (60%+)**	**Moderate (20-60%)**	**Low (<20%)**
Should be encouraged			
Mobility	1	9	0
Oral fluids	0	2	8
Companionship	0	2	8
Should be avoided			
Routine enema	3	4	3
Routine shaving	2	0	8
Routine episiotomy	0	7	3
Supine position	10	0	0

Source: Analysis of baseline exit interview data (see Annex 3).

Table 6.4 Hospital behaviour compared with evidence-based standards at follow-up

	Number of hospitals (n/N)		
Standard	**Routine (60%+)**	**Moderate (20-60%)**	**Low (<20%)**
Should be encouraged			
Mobility	2	7	1
Oral fluids	0	4	6
Companionship	0	4	6
Should be avoided			
Routine enema	1	2	7
Routine shaving	0	0	10
Routine episiotomy	0	6	4
Supine position	10	0	0

Source: Analysis of follow-up exit interview data (see Annex 3)

'Good practice' at baseline and follow-up

Table 6.5 explores whether hospitals became more or less evidence-based in their practice between baseline and follow-up. For procedures that should be routine or at least used moderately, there was an increase in the number of hospitals with good practice at follow-up for oral fluids (2 hospitals at baseline, 4 at follow-up) and companionship (2 to 4), but not for mobility (10 to 9). For practices that should be used infrequently, practice improved for enemas (3 hospitals with infrequent use at baseline, 7 at follow up); for shaving (8 to 10); for episiotomy (3 to 4); but supine position remained widely practised (table 6.6).

Table 6.5 Number of study sites demonstrating good practice at baseline and follow-up (based on compete data from 10 study sites)

Good practice	Baseline (n/10)	Follow-up (n/10)	P value[1]
Routine (60%+) or moderate (20-60%)			
Mobility	10	9	>0.9999
Oral fluids	2	4	0.6285
Companionship	2	4	0.6285
Low use (<20%)			
Enema	3	7	0.1789
Perineal shaving	8	10	0.4737
Episiotomy	3	4	>0.9999
Supine position	0	0	N/A

[1] Fisher's exact test Source: Based on analysis of exit interview data (see Annex 3)

Fisher's Exact test was used to determine the significance of the differences in good practice at baseline and follow-up. The P-values indicate that the null hypothesis cannot be rejected for any of the changes in good practice (i.e. P values are all above the 5% significance level).

Although the data in table 6.5 highlight some important changes to practice, the results represent practice at just ten study sites. In addition, the sample sizes used at each study site are small, and the actual percentage rates documented in Annex 3 show that while there is potential for clinical significance, no changes were statistically significant. A larger sample would increase the statistical power of the study, and be more likely to detect a real change in behaviour, if it exists.

6.3 Variation in provider behaviour

The last phase of analysis examined variation in provider behaviour across the study sites. Table 6.6 provides a summary of practice changes from baseline to follow-up, and shows the total number of changes in the intended direction at each study site. The table is based on absolute changes documented in Annex 3.

The table shows that at some hospitals, provider behaviour changed for most of the marker practices, and at others change was minimal. For example, at two hospitals practice changed in the intended direction for six of the seven marker practices; and at four hospitals practice changed as intended for five marker practices. At other study sites, intended changes to practice occurred for just three or four practices.

Table 6.6 also illustrates that change in behaviour was more likely for some practices than others. Use of enemas was reduced at all maternity units except one, where enemas were not used prior to the workshop. For episiotomy, shaving, companionship and mobility during labour, practice changed in the right direction at seven hospitals. Just three sites reduced the use of supine position and the percentage reduction was small (see table A3.7, Annex 3).

Table 6.6 Summary of changes from baseline to follow-up by study site and marker practices

	Intended increase			**Intended decrease**				
Study site	Mobility	Oral fluids	Compan-ionship	Enema	Shaving	Episi-otomy	Supine position	**TOTAL in intended direction**
Intervention								
A	+	+	*	-	-	-	*	5
B	-	-	*	-	-	-	*	3
C	-	-	+	-	-	-	*	4
D	+	+	+	-	+	-	*	5
E	+	+	+	*	+	+	*	3
Control								
F	+	+	+	-	-	+	*	5
G	+	+	-	-	-	-	-	6
H	-	-	+	-	-	-	-	5
I	+	-	+	-	+	-	*	4
J	+	+	+	-	-	+	-	6
TOTAL in intended direction	**7/10**	**6/10**	**7/10**	**9/10**	**7/10**	**7/10**	**3/10**	

Note: * = no change; + = rate increased; - = rate decreased

Source: Analysis of exit interview data (see Annex 3)

Classification of study sites

Given the variation in provider behaviour following the change programme, it is possible to group the study sites according to the extent of changes to practice. Table 6.7 shows hospitals where practice changed in the intended direction for five or more procedures (high change); and those where practice changed for four or less procedures (low change). The classification of study sites according to the extent of change in provider behaviour was triangulated with qualitative data, which explored critical factors that enabled behaviour change at the 'high change' sites (see chapter 7).

Table 6.7 Classification of study sites based on extent of behaviour change

High change	**Low change**
Five or more changes in intended direction	Four or less changes in intended direction
Hospital A	Hospital B
Hospital D	Hospital C
Hospital F	Hospital E
Hospital G	Hospital I
Hospital H	
Hospital J	

Source: Data contained in table 6.6

6.4 Summary

Box 6.1 Impact of the change programme on provider behaviour

- Considering the various analyses presented, change in practice in the intended direction was consistently more likely for enemas and shaving. Supine position, the use of oral fluids, and companionship during labour were less likely to have changed at follow-up.

- The Mann Whitney U results presented in section 6.1 show differences in median practice rates at follow-up between intervention and control groups for most practices. No differences were significant, apart from supine position.

- The analysis in section 6.2 compared practice to evidence-based standards. Fisher's exact results show that none of the changes in good practice from baseline to follow-up were significant. The raw data in Annex 3 indicate potential clinical significance; but a larger study is necessary to detect change in behaviour if it exists.

- The variation in provider behaviour presented in section 6.3 facilitated classification of study sites into those where provider behaviour changed in the intended direction for five or more practices, and those where change occurred for four or less practices. This suggests that the change programme had a greater impact on behaviour at some study sites.

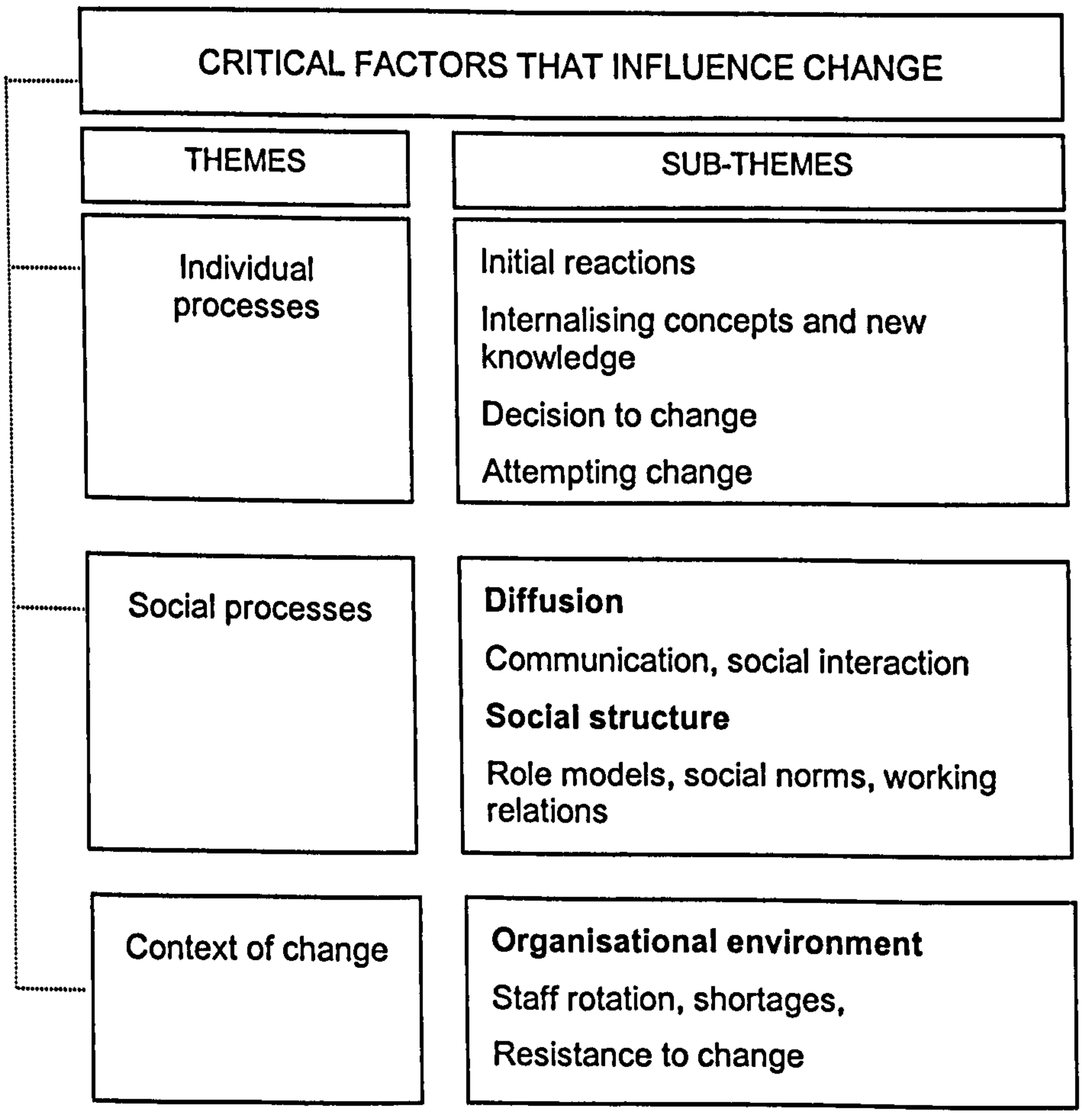
- Chapter 7 presents qualitative findings that explore the influence of critical factors on behaviour change at study sites (objective 4, section 4.2).

Chapter 7 Critical factors that influence behaviour change

7.1 Introduction

Objective 4 of the study (section 4.2, chapter 4) was to explore and understand critical factors that influence behaviour change. Primary analysis of narrative data derived from in-depth interviews and focus group discussions identified main themes: individual processes, social processes and contextual issues; and related sub-themes underlying changes to practice. These are documented in the thematic frameworks in Annex 4, and illustrated in figure 7.1. A coding index was constructed from the thematic frameworks, and applied to the whole data set; matrices were then developed to organise and interpret the narrative findings (see Annex 5). The findings presented in this chapter draw on original quotes and extracts in the matrices.

Figure 7.1 Critical factors that influence change: themes and associated sub-themes identified during analysis.



Dimensions of change

Secondary qualitative analysis explored the multi-dimensional nature of behaviour change (see section 4.5). Case studies were used to map out individual and social processes of change, and the context of change at each hospital (using matrices from the primary data analysis). One dimension of change highlighted by the qualitative data was the level of motivation for change; varying degrees of (individual and social) motivation were apparent across all study sites. Level of motivation was then explored in relation to quantitative data on extent of change at each study site (section 6.3, chapter 6). This led to the creation of a typology of behaviour change.

The following sections present case studies of behaviour change from the study sites. Firstly, hospitals where staff appeared to have high levels of motivation are considered, and the critical factors influencing behaviour change at 'low change' sites are compared with those at 'high change' sites (see classification in section 6.3, chapter 6). The second section focuses on hospitals where motivation among staff was lacking; and the critical factors influencing behaviour change at low and high change sites are again compared. A typology of behaviour change is then presented in section 7.4.

Primary and secondary qualitative analyses are based on eight focus group discussions and 14 in-depth interviews (see methods, section 4.4). At hospital H no workshop was conducted, and follow-up qualitative data are not available. At hospital I, in-depth interviews only were conducted at follow-up, so it is not possible to comment extensively on social and individual processes of change.

7.2 Case studies of high motivation hospitals

Low change

Qualitative data suggest that individual provider motivation was high and that a high level of social interaction existed among staff at hospital C, yet quantitative data indicate low change (section 6.3). Closer examination of qualitative findings revealed that cautious attitudes towards change resulted in contemplation rather than action at this hospital.

Individual change processes

There is evidence that providers at this hospital accepted the need to change, and recognised the importance of updating practice. The following comments illustrate how providers internalised the concept of evidence base practice, especially in terms of the need to use practices that do more good than harm:

'At the beginning we always thought that the traditional ways was the best way. But then the Better Births Initiative, it's more sense, and you find that by the way, you were doing a bit more of harm to the mother...it was good, you feel that by the way, you can do more good for the mother.' (FDG hospital C)

'...and you know, the things we did in olden days when we were training, it was made out that you must do this. There was nothing proven that it works or it doesn't work. So I think maybe to practice evidence based medicine we need to update ourselves.' (FGD hospital C)

'It was quite useful, it takes us back to reflect on what we were doing before, and you find no, there are better ways.' (FGD hospital C)

Knowledge and understanding are prerequisites for behaviour change, but it would seem that a more cautious attitude towards change might have precluded decisions to change practice at this hospital. The following extracts from the primary analysis typify provider attitude towards change at this hospital. A doctor described how he felt that practising a different way was a 'big change':

'You see, just the thinking of "let me do it another way" it's a very big change you see...to think that you don't have to do it as before all the time.' (FGD hospital C)

A midwife envisaged that it would take some time before the goals of Better Births would be reached:

'...we've tried very hard to utilise the Better Births Initiative in our department, and so far, I don't expect it to work immediately, it will take a while because some of the staff get out of the labour ward and we get new staff and we start again. But I think by the end of this year we will have achieved your goal.' (FGD hospital C)

Another doctor suggested that change need not be viewed as something radical, but he agreed it would be a slow process:

'...they should not think that it is really a radical change, it is something that you talk about it and just try doing it as you do your daily work. And you realise that there is something...and I am sure we are going slowly there to discover the good of this.' (FGD hospital C)

The change programme influenced conceptual thinking about practice at this hospital, even if it did not directly trigger change. A midwife described how the information in the workshop made her think about the rigidness of current practice:

'Just to discuss what was done, and get views from other people, it's [the workshop] making life more easier, and you appreciate your job. You know exactly what you are expected to do...and it sort of removed the rigidness, that this is routine, so I must do it definitely. You see, somebody will come and say "why didn't you cut an episiotomy, she was a primigravida?", but you can give facts, that I didn't cut because of one, two three, four [reasons].' (FGD hospital C)

Information imparted during the workshop also enabled providers to compare their current practice with the evidence; a doctor described how he compared his practice for episiotomy and enemas:

- 'When you hear it at the workshop, maybe you think that no, will it really work? But when you are next to the patient you see, you really feel the difference. The other day the patient wanted it [an enema], but then you see that without an enema there is not much difference.' (FGD hospital C)

'...and like, from my own experience it used to be a routine for every primigravida to be cut, so now I've seen that its possible for a primigravida to deliver without an episiotomy.' (FGD hospital C)

Social processes of change

Dr Brown (opinion leader and workshop facilitator, see section 3.4) was clearly an important role model for providers at this hospital; her influence was frequently mentioned:

'I think when they came Dr Brown was also here. And, you know we had a lot of problems, unsure things that we discussed with her. And you know, er, putting her facts on evidence based medicine, she would tell us go and try this...and we really benefited a lot.' (FGD hospital C)

'I think Dr Brown spoke about giving an enema, we always thought speeds delivery, which actually when she told us about it we tried it as well, but it doesn't actually, there is no difference.' (Midwife, hospital C)

Social interaction and working relationships with colleagues were recognised as important determinants of change. During group discussions providers emphasised the importance of communicating with all departments to bring about change:

'I think first talking about it, if the departments meet, if they start to mention about it. You see when we don't talk about it, you still think it doesn't work. Just to give it a try, just to say OK let's try and see.' (FGD hospital C)

'...that is very, very important. If all the departments can put that in practice and say "OK, look, in other places it has worked, let us first try and see", just not say no when you haven't tried...but its only by talking and thinking about these things that you come up with this [change].' (FGD hospital C)

High change

Qualitative findings suggest that staff at hospitals F, D, and J were highly motivated. These hospitals were also classified as 'high change' sites where practice changed as intended for five or six marker practices (see section 6.3). Qualitative data demonstrate that a combination of individual understanding of the need to change practice and the presence of social structures to support and maintain changes was conducive to behaviour change at these sites.

Individual change processes

The qualitative data provide evidence of a well-defined adoption process, where individual providers reacted enthusiastically to the programme, understood the need to change, and had positive attitudes towards changing practice. The following extracts illustrate the initial enthusiasm providers at these hospitals showed towards the change programme:

'I didn't know anything about it before you came here obviously. It was interesting that there is actually someone looking after these things, so we can improve patient care. I'm absolutely for this.' (Medical Officer, hospital F)

'Really it was an eye opening to us...we really recognised that most of the things we really should just cut off and hence we did. And the people [at the workshop], they took it very positively.' (Midwife, hospital D)

One midwife at hospital J explained how she had initially been cautious about the aims of the programme:

'I thought it wasn't going to be possible, especially with episiotomy, the things we are used to using in the ward. And with the enemas, we thought, oh god, I'm going to have all those big stools!...but after experiencing it I think its easy.' (Midwife, hospital J)

Other stages in the adoption process were imperative to behaviour change at these hospitals. Firstly, individuals seemed to internalise the concept of evidence base

practice; comments from providers suggest that they had a good understanding of the need to change practice to keep up to date:

'I think it's very, very important. The research keeps on continuing, and the older things may not be good any longer, because of the latest research. The research may have reviewed that such and such a practice is in fact not beneficial to the patient...so by all means something that has been discovered that no longer works should be stopped immediately, and we should go on to something which can benefit the patient.' (FGD hospital J)

'...I mean its changing, in the old times we believed some things that are already being proved wrong. Now maybe we are doing some things that's going to be proved wrong in a year's time and we would like to know that. We don't want to keep doing the wrong thing.' (FGD hospital F)

Secondly, attitudes towards change were positive. During group discussions at these hospitals the general consensus was that changing practice is achievable and clinicians should adapt to change:

'I think people, when they have to change, they should really ask themselves the positive side and the negative, the disadvantages and advantages and one thing is really just to adapt to the change.' (FGD hospital D)

'I think this is very good, about what is enema, shaving is unnecessary, things that we did do before, we now perhaps have to change. So now we don't have to be resistant anymore.' (FGD hospital J)

At all three hospitals, there is evidence that providers readily accepted the new research evidence presented to them and that the workshop had influenced their decisions to change. At hospital D in particular, midwives explained how the workshop had helped them realise when change was necessary, and that it had motivated them to change their practice for several procedures:

'After that meeting we had [the workshop] we are not giving all the patients the enema. There were some that needed it, but after that meeting we respected not giving the patient the enema...then we found that this was unnecessary, because the woman would deliver whether given an enema or not...' (FGD hospital D)

'After the workshop we just altered positions. So with the various positions the patient won't tear...the positions are better so it is unlikely that she will tear, if it does, we can suture it.' (FGD hospital D)

'...on intravenous infusions for delivery, whereby it was routine each and every patient in labour gets intravenous fluids. And then in the workshop...we should give fluids...so the workshop really in fact helped us because we no longer use IV lines unless we feel it is really necessary.' (FGD hospital D)

'Yes, shaving was a routine, and when we are preparing patients for theatre that's one situation that we did it straight away. So, after the workshop we realised that shaving is not necessary...' (FGD hospital D)

At this hospital providers also described how the workshop had given reasons for change and enabled them to question current practice; this had helped them decide to change:

'...there are others who are giving the enemas and others who are not giving. And the people giving didn't have a reason why they were giving enema and why they are not. So after the workshop it has given them reasons.' (FGD hospital D)

'What I liked most was, as I said, we are practising some practices without knowing why we are doing it. Like for instance the enemas, we are doing it for the sake of doing it, but nobody said you must just give enema...the workshop sort of gave us questions, 'why are you doing that?', 'do you benefit from what you are doing or is it just a waste of time?'. As I said, with the workshop we really realised it was cost effective with the resources too.' (Midwife, hospital D)

Motivation to change practice was also evident at the other hospitals; and the workshop appeared to be a strong influence:

'Episiotomies, usually its, we don't perform them anymore. From before the, this workshop they were routinely performed.' (FGD hospital F)

Providers at hospital F also reduced the use of shaving after the workshop, and were in agreement that the workshop influenced their decision:

'It was after the workshop, we didn't stop ourselves doing shaving. It was after the workshop.' (FGD hospital F)

'Yes, I don't think it was anything else, it was just after your workshop, we never did it.' (FGD hospital F)

Views were similar at hospital J where providers mentioned that the workshop had helped them decide to change use of episiotomy and enemas:

'...not routinely, but you know, performed. But now I see the very same people who were actually you know, performing those episiotomies are no longer performing them like that. So, we can see that the workshop has changed them.' (FGD hospital J)

'...but at the moment I think, maybe it is because of your workshop that it is no longer done, because we don't give it anymore [enemas].' (FGD hospital J)

Social processes of change

While individual motivation and willingness to change were obviously important prerequisites for change at hospitals F, D and J, there is evidence that social processes also supported behaviour change. Communication between staff was imperative to diffusion of the new ideas among all levels of staff. A good example of this is at hospital D, where communication and interaction among staff helped build a consensus for change:

'...really we felt it was of good to have people coming to tell us, and we realised the extra things we have been doing. Well, although change is difficult, but it didn't take us too much to compare what we are doing to the new ideas and agree. And again other people were there [who had not attended the workshop] and they were able to understand what was it about the workshop – we came together to share the information and came to a consensus.' (FGD hospital D)

'What I liked most was that you included doctors as well. Because you cannot work in isolation, it should be doctor-nurse interaction. Yes, I remember in the first workshop we had everybody, and we had good discussions.' (Midwife, hospital D)

A good working relationship between midwives and doctors was particularly apparent at hospital D, where teamwork fostered innovative approaches to changing practice. One midwife explained how they had requested that the doctor in charge write an internal memo regarding the use of shaving to informed all staff of the changes to practice at this hospital:

'...what we really did not reach...its concerning the shaving of patients; because it was creating a problem to others who were not in the workshop. It sort of respects why all of us need to be involved in the change. So er, we asked doctor ...to write us an internal policy so that the theatre people can be clear that since the workshop patients coming to theatre are not supposed to be shaved, and it helped.' (FGD hospital D)

Staff at this hospital had also established a committee for support during childbirth, with promotion of the Better Births Initiative as a main goal. This is further evidence of staff motivation and effective social structures to support behaviour change.

The opinions of respected peers were also important influences on practice at these hospitals. Midwives mentioned the role of senior doctors and colleagues in influencing their practice or simply as a source of information:

'We have contact with Dr...an obstetrician/gynaecologist, he's coming round, initially once a week but I haven't seen him for a while. He's coming, and if there is something we can ask him. We've got a senior colleague as well who's doing gynae, we can just ask.' (FGD hospital F)

'...if you're not sure about it, you ask the doctor...and then in the situation if there is a patient and you don't know...you can ask him" when it s like this, why so we do this?".' (FGD hospital D)

'You find that because most of the time you are there with doctors, there is a doctor who works with you – he wants his own practices, so we follow that doctor. Then when he goes, you stick on what he agreed with, until another one comes and he sees something being done and starts changing.' (Midwife, hospital D)

Who exactly were the respected peers and senior colleagues, and how they influenced decisions to change practice for the marker practices over the period of this study is difficult to ascertain from the small sample of health professionals interviewed in this study.

Context of change

Although high motivation and behaviour change were apparent at these study sites, it is important to examine the context within which the changes took place. During group discussions and interviews providers at these hospitals frequently mentioned that rotation of staff between different wards, and staff shortages in the labour ward, were constraints to changing practice. One midwife described clearly how the staff rotation system made it difficult to sustain changes to practice:

'I think, like, we are in a hospital and people do rotate, and sometimes we are having newly qualified people who will be allocated in the ward, and we can't take it for granted that people down there will know what to do. We need to continue with the workshopping and in-service, and giving to new personnel who are coming so they also know what to do. Because, like, for instance, as we allocate people to different wards, others are still sticking to the old, er methods we use – for coming back they need to be re-oriented that we have changed the practice in this way.' (Midwife, hospital D)

Similarly, a midwife at hospital J explained the importance of conducting the workshop with all midwifery staff, some of whom may be based in other departments, but who are likely to rotate to work in labour ward:

'The thing is, those people who attended the workshop, they are not in one department...so it's not possible that they implement these things...I think they can be altered by this regular thing, the workshop, because it will be eventually that everyone has attended, so everyone will have the knowledge. We mustn't concentrate only on this ward, because they change them with antenatal ward, so that can be arranged by sisters – even if you are not working on ward two [labour ward] you can go to that lecture [workshop], so that when you are allocated there you will know.' (FGD hospital J)

In addition to staff shortages, providers at 'high change' hospitals recognised resistance as a limitation to instituting changes to practice:

'...I was going to say, the problem could be, you know, some people are difficult to change. You must be honest and say it out. When somebody has personally not attended whatever [workshop], then you come as her colleagues, at her level to try to say to her, this is how it should be done. You may...experience some resistance.' (FGD hospital J)

'One thing I will say is it is difficult for people to accept the change...the personnel, to deal with the introduction of the Initiative, it's very difficult. Like the shaving of the patient, some people don't understand that we have changed and now moved to taking the patient to theatre without shaving.' (FGD hospital D)

An interesting comment made by a doctor at hospital D, was that change can create conflict between those who have adapted their practice and those who have not, and that this could challenge the change that has taken place:

'At times it creates a problem. One of the things that this change created is people become stereotyped. Now they focus on the change that you have introduced...then there is a group who is not implementing. It is also hard for those personnel who do not ever change...and it's going to challenge the whole system. So there is conflict between those who don't want to change and those who have changed...the resistance to change.' (FGD hospital D)

Providers at hospitals F, D and J seemed to be aware of factors within the labour ward environment likely to prevent change from happening for some practices. For instance at hospitals F and J, staff commented on the physical and structural limitations of the labour ward prevented them encouraging women to adopt different positions for delivery (see chapter 5, section 5.2). Despite these problems, quantitative results indicate that labour ward staff managed to make changes to their practice.

7.3 Case studies of low motivation hospitals

High change

Hospitals A and G were classified as 'high change' sites; practice changed in the intended direction for five and six marker practices respectively (see section 6.3). But qualitative data reveal that motivation levels among staff were generally low. Further exploration of qualitative data (see matrices, Annex 5) shows that changes to practice seemed to be the result of specific individuals' motivation and effort, rather than group consensus and support for change.

Individual change processes

Providers at these hospitals did agree the need to change and acknowledged the need to update practice, as the following narratives illustrate:

'Yes, its necessary to change practice...because some of the things that you have done might not be useful or beneficial now.' (FGD hospital A)

'It keeps you on your toes and er, you are kept informed of what is happening in your practice. I think in every work situation it is necessary to update yourself, you can't just carry on.' (FGD hospital G)

'I always like to learn. I don't like to be redundant, I don't like to be stuck with some procedures that have been done away with a long time ago. I like to keep up to date, up to standard, with the rest of the institutions, especially in terms of the latest service delivery.' (FGD hospital A)

Despite the capacity of providers at these hospitals to internalise the concept of evidence-based practice, attitudes displayed during focus group discussions suggest hesitance and resistance towards change:

'Change is difficult, you can't just jump in when you are used to doing something.' (FGD hospital A)

'...if you introduce change, you must introduce bit by bit, not just many things at a time...you can change with one thing, but you can still get left behind with some things.' (FGD hospital G)

The qualitative data demonstrate individual's efforts to compare their current practice with the evidence, and of individual providers' attempts to implement changes to practice at these hospitals. At hospital A providers gave examples of how they had attempted to reduce the use of enemas and episiotomies:

'I tried to compare my findings with the research, because I've been using the enema, I said to myself, let's see what happens.' (FGD hospital A)

'...for instance, I was on call last night and I delivered a breech and a primap, and we didn't do any episiotomies. I had an argument with my midwife and said, "no, only give when its necessary" and this one wasn't necessary. So if we don't do, at least we know that what we do is the right thing.' (Doctor, hospital A)

'I have learnt a lot about the necessity of doing something from the workshop. And then I compared to my practice. Before I would do them all the time, like routine episiotomies to all patients, and shaving for all women.' (FGD hospital A)

At hospital G, a midwife described how women's experiences had helped her to reduce the use of episiotomy:

'I used to do episiotomy and at the workshop I was told we mustn't do. Then I went outside to seek some more information [and asked women] "Did they do episiotomy on you?"...most of them said yes and "its painful even now". So I said I'm not going to cut them anymore, rather let them tear.' (Midwife, hospital G)

Social processes of change

Qualitative data indicate that individual effort and motivation helped to bring about change at these hospitals, but there was little evidence of any social interaction and communication between doctors and midwives (see matrices in Annex 5).

Context of change

Providers at hospitals A and G discussed the organisation of work within the labour ward, and in particular the frequent rotation and turnover of staff, as a constraint to changing practice and institutionalising new behaviours. Providers at hospital A felt quite strongly that staff shortages prevented them offering more choice to women during delivery, as one midwife stated:

'The facilities are important, like, if the department is not well staffed. We cannot implement the squatting because we are short staffed, we cannot do it.' (FGD hospital A)

Another midwife added:

'We do not have enough staff, they [women] do not have any option [regarding delivery position], we cannot do anything else. So, until we can address the staffing problem as well, I we have enough people the OK, we can attend the emergencies and other essentials and then offer options to women. But if we look at the staffing facilities, we are not left with any other option.' (FGD hospital A)

Providers at hospitals A and G also mentioned the difficulty in persuading all staff to change their behaviour, and the climate of resistance to change that sometimes prevailed. At hospital A, providers mentioned the importance of updating protocols to avoid resistance to change:

'I think also if you want something to change you must change the protocol for everybody to follow. If you don't do that then there are people who will not change.' (FGD hospital A)

'Like a new thing, you can never get permission for protocols immediately, so the difficulty is that some people you say, "please maybe not do this", they may not agree, they may be used to the old method of doing things, that is the only problem.' (Doctor, hospital A)

In addition, staff at hospitals A and G commented on physical constraints that prevented them encouraging companionship during labour and different positions for delivery. In particular, the lack of privacy afforded by the layout of the hospital wards was regarded as a barrier to implementing companionship. Inadequate facilitates, particularly old style beds, were mentioned as barriers to allowing women to deliver in positions other than supine. At hospital G staff also acknowledged their lack of experience in delivering women in other positions as an important barrier to change (see chapter 5, section 5.2).

These examples illustrate the difficulties faced by health care providers trying to implement change in resource poor settings, and could explain the apparent lack of motivation at hospitals A and G.

Low change

Hospitals B, E and I were classified as 'low change' sites, where practice changed in the intended direction for four or less marker practices (see section 6.3). Qualitative data suggest low motivation among staff, and provide evidence that changes to behaviour were made for convenience rather than to institute best practice. At hospital I in-depth interviews only were conducted at follow-up, so it is not possible to comment extensively on social and individual processes of change.

Individual change processes

The primary qualitative analysis provides little evidence of staff accepting or understanding the concept of evidence-based practice at these hospitals. Attitudes towards change were quite definite at hospital B, where midwives perceived some of the proposed changes to practice as unnecessary and imposing:

> '...this workshop wants us to discard so many things...some of them are acceptable, they are good, some are not. So I think its going to take a long time to do away with enemas.' (FGD hospital B)

> 'We shouldn't change for the sake of changing...you know, like things that really need changed...there needs to be a good scientific reason.' (FGD hospital B)

> 'In fact, we were uncomfortable with pounding on us everything we must do, not knowing are we satisfied? Yes, it was imposing on us.' (FGD hospital B)

Midwives at this hospital appeared to be more comfortable with traditional practices; some admitted that old habits die hard:

> 'Ja, like the new information means there is some research that has been done, the scientific information is there, then, like you know, old habits, we are in our comfort zones' (FGD hospital B)

> 'Yes, attitudes to change, as I say, some of us would rather stay in our comfort zones.' (Midwife, hospital B)

During in-depth interviews individual midwives at this hospital spoke more openly about their attitudes towards change, and described how it would take time for their attitudes to change. One midwife compared the process of changing practice to an advertising campaign:

> 'Now that we have read it over and over again we are certain to take it serious. You see, you know sometimes when things start, you are like *(shrugging her shoulders)* until it dawns in your mind that you really are supposed to change. So, we need to hear it over and over again...Yes its like an advert, before you can really get into buying whatever it is advertising, you need to see it time and time again, until its in your mind.' (Midwife, hospital B)

Qualitative data indicate that decisions to change practice at these hospitals were usually made for convenience rather than to update practice. When midwives explained how decisions had been made, it appears that saving time and effort were key influences rather than the aspiration to do more good than harm. The following extracts illustrate typical comments:

'Before we were giving them [enemas], but after we got that information, we could see that really it was a waste of time.' (FGD hospital E)

'...like most of the deliveries I've made now, I didn't do the enema. But not because of choice, I was pressed for time, the patient was already very advanced in labour.' (FGD hospital B)

'We were implementing not to cut episiotomies, but it [the workshop] still helped us because now we emphasise that er, we are not going to bother ourselves cutting unnecessarily.'(FGD hospital E)

'We just put it up after delivery if the patient needs it [IV line]. Before it was all primaps, but now we don't bother ourselves, we just encourage them to eat and drink.' (FGD hospital E)

'Yes, its good to learn that we can do without those things, its time saving, it saves time, energy and resources.' (Midwife, hospital B)

Providers at hospital B were honest about the lack of change after the workshop, but suggested that it had helped them to conceptualise their work in a different way:

'You know, honestly, nothing has changed, nothing much has changed. But now it has created an awareness of certain things we are doing.' (Midwife, hospital B)

'OK, the workshop, it made one to not think along just one thing...the workshop has helped us, it has just taught one just to think broadly. That we shouldn't just...there is a reason for everything.' (FGD hospital B)

At hospitals B and E, there was little discussion around deciding or attempting changes to practice.

Social processes of change

Communication among colleagues was rarely discussed, but providers at hospital B described how the workshop had opened communication among labour ward staff:

'I think somehow it has even opened up some communication, because we took most of the things for granted...and enemas especially. So after you came we, it kept us talking about something that was routine, we just did it. So somewhere, somebody wanted to know why it was introduced, why is it done? So its going to be ongoing...people were talking about it after that workshop.' (FGD hospital B)

At hospital E, Dr Brown's influence on decisions to change practice was mentioned briefly:

'We were wondering really what is it all about? But when Dr Brown came here to explain, we accepted the changes and then practised most of them.' (Midwife, hospital E)

'We don't give enemas these days, since Dr Brown came here, we don't give.' (FGD hospital E)

Working relationships between midwives and doctors and other social structures to support changes to practice were rarely discussed at these hospitals.

Context of change

The low motivation and low change at hospitals B, E and I must be set in context; the working environment and staff attitudes are important influences on attempts to initiate change from an established routine. At these study sites providers seemed to believe that the changes had been imposed and were not relevant to their setting.

At hospital B, resistance from labour ward staff appeared to be based on beliefs that the changes were unnecessary and had been imposed, as the following quotes illustrate:

'...this workshop wants us to discard so many things...some of them are acceptable, they are good, some are not. So I think its going to take a long time to do away with enemas.' (FGD hospital B)

'We shouldn't change for the sake of changing...you know, like things that really need changed...there needs to be a good scientific reason.' (FGD hospital B)

'In fact, we were uncomfortable with pounding on us everything we must do, not knowing are we satisfied? Yes, it was imposing on us.' (FGD hospital B)

'...the people who are exposed to this [change] is us, on the ground. So we need to be consulted.' (FGD hospital B)

Staff at hospital B also frequently mentioned that the infrastructure and lack of facilities at the hospital prevented them allowing companions to support women during labour. In particular, the layout of the labour ward and insufficient space were considered important barriers to implementing good practice (see section 5.2).

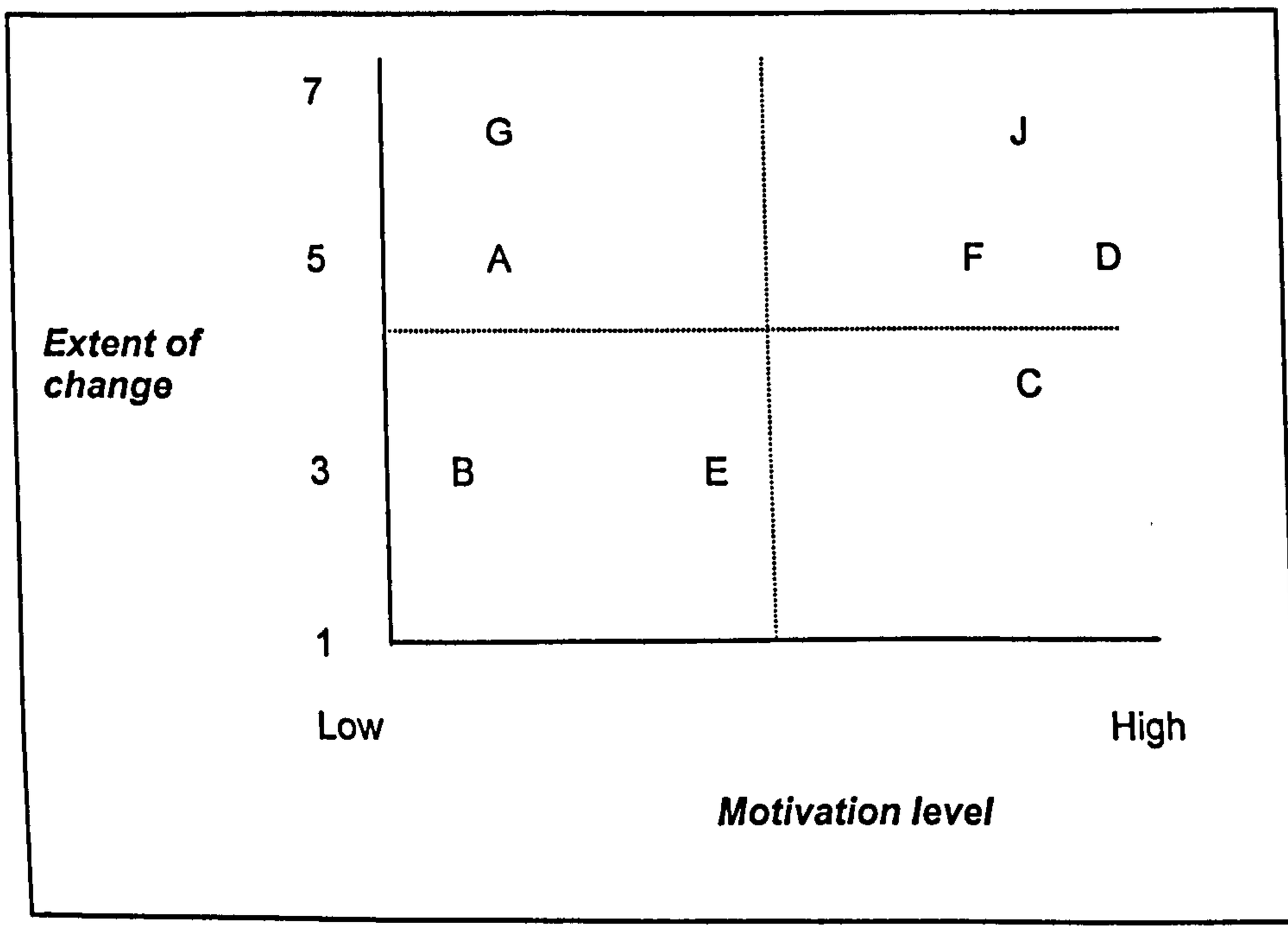
7.4 Towards a typology of behaviour change

Distinct patterns of behaviour change emerge when motivation and extent of change at the study sites are considered together. The relationship between motivation levels and extent of change is easy to visualise when plotted on a chart. In figure 7.2 each letter represents the corresponding study site and they are positioned according to evidence of motivation to change (X-axis) and the extent of behaviour change (or number of changes in the intended direction (Y-axis)). Decisions about where to locate hospitals on the

scales for motivation were based on the preliminary analysis of qualitative data presented in section 7.3.

The figure highlights important linkages between motivation and extent of change and how they varied at each study site. At hospital B staff motivation was low and the extent of change low; hospital E showed a similar number of changes, but higher motivation levels. Staff at hospitals G and A displayed low motivation but the extent of change was quite high. At hospitals D, F and J both motivation levels and extent of change were high. Staff at hospital C showed a high degree of motivation, but fewer changes to practice were made.

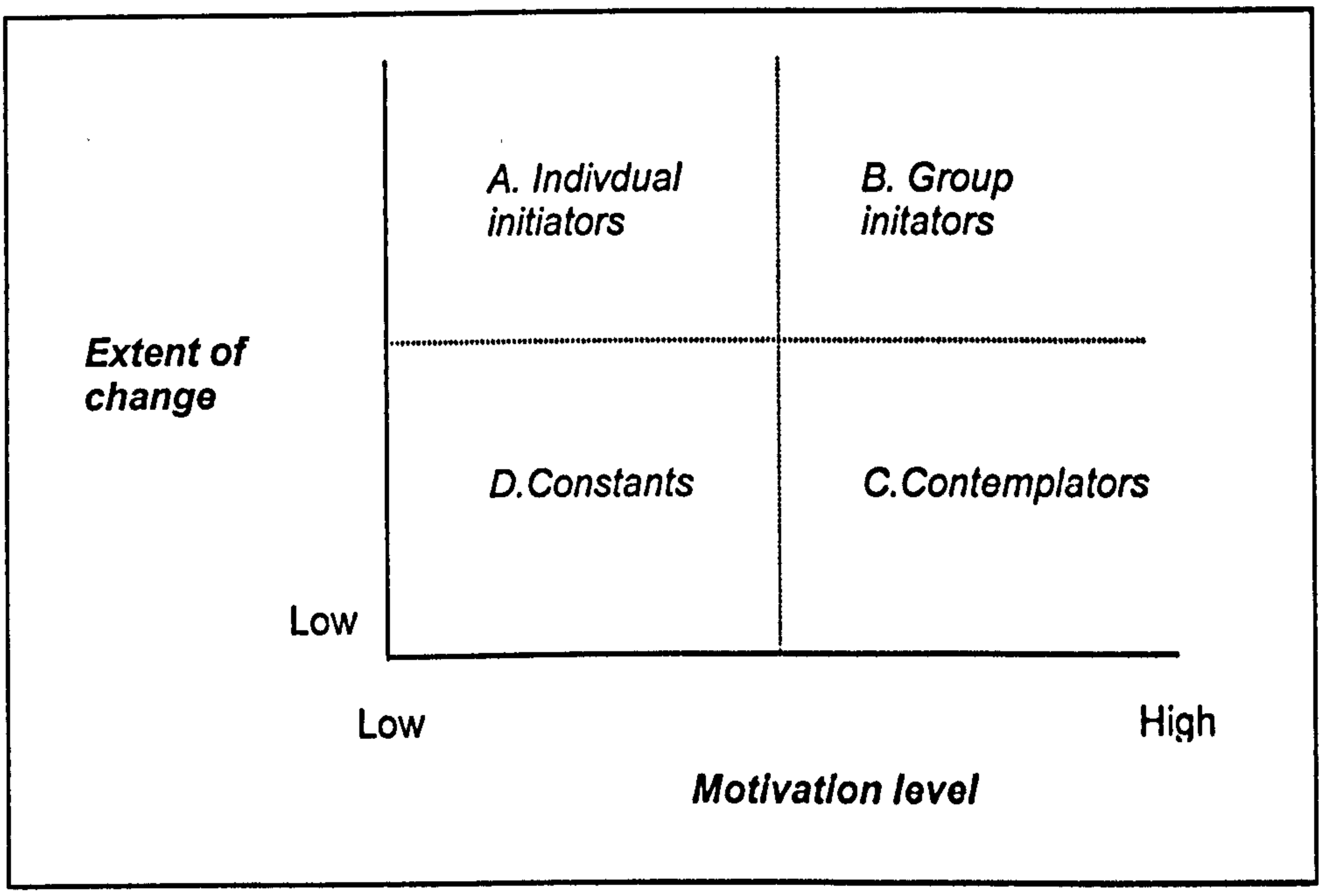
Figure 7.2 Motivation level plotted against extent of behaviour change at each study site



Source: Analysis of quantitative and qualitative data

It is apparent that a combination of individual and social processes encouraged staff motivation and facilitated behaviour change at some hospitals, and the absence of some critical factors prevented change from occurring at others. Figure 7.3 shows four categories of behaviour change, developed from the analysis of motivation level and extent of change at the study sites.

Figure 7.3 Typology of behaviour change



Source: Analysis of quantitative and qualitative data

Group initiators

At hospitals where motivation levels were high and extent of change great (quadrant B in the figure), qualitative data show that a combination of individual understanding and motivation, and the presence of social structures to support and maintain changes, was conducive to behaviour change. Providers at group initiator hospitals displayed positive attitudes and viewed change as feasible, even if a long process; these factors seemed to trigger experimentation and comparison of practice with the evidence to bring about changes. Labour ward staff appeared to work well together and this helped to institutionalise changes to practice; by involving all levels of staff changes were more easily adopted. Communication among colleagues also enabled widespread behaviour change.

Individual initiators

At hospitals A and G, practice changed for five and six practices (respectively), but health professional behaviour change was not associated with high levels of motivation among all staff (quadrant A). At these hospitals changes to practice seemed to be the result of individual motivation and effort, rather than group consensus and support for change. The lack of motivation among labour ward staff could be explained by frequent rotation and shortage of staff at these hospitals.

Contemplators

At hospital C, provider motivation was high, and despite evidence of adoption and diffusion of information, changes to practice were few (quadrant C). Qualitative findings reveal that cautious attitudes towards change resulted in contemplation rather than action at this hospital. There was less evidence of attempts to change behaviour, although providers did describe the importance of comparing their practice to the evidence. Providers also recognised the need for more social interaction to bring about change.

Constants

At hospitals B and E, changes to practice were few (three marker practices) and motivation was generally low (quadrant D). Evidence of individual and social processes varied between the hospitals, and qualitative evidence suggests that the changes were implemented more for convenience than to institute best practice. Providers at these hospitals regarded change as unnecessary, which could have contributed to their lack of motivation to attempt change. An interesting finding was the frequent reference to the influence of Dr Brown (a local opinion leader) at hospitals described as constants; despite this apparent influence, practice changed little at these hospitals.

7.5 Organisational context and extent of change

The typology of behaviour change presented above is derived from an analysis of individual and social processes of change, and illustrates the relationship between one critical factor (motivation level) and extent of behaviour change at the hospitals. In an attempt to explore the influence of other critical factors on decisions to change practice and the extent of behaviour change at the study sites, the organisational and socio-economic characteristics of the study hospitals were considered.

Table 4.1 (chapter 4) shows the characteristics of study sites in terms of the level of care provided, facilities and staff available, and the socio-economic status of the populations served by the hospitals. These organisational and socio-economic characteristics were compared to the data in figure 7.1, to determine any relationship with hospital performance in terms of motivation levels and practice changes. No clear trends emerged from this comparative analysis, and the small number of hospitals involved makes identifying such a trend difficult. However, had the individual settings (context) and organisational environments of the study hospitals been systematically explored in more depth using qualitative methods, this would have generated important additional data on the organisational structure and culture of the hospitals, and allowed a more

rigorous analysis of the influence of the organisational context and hospital settings on implementation of practice changes (see study limitations, section 8.7).

7.6 Summary

Box 7.1 Critical factors that influence behaviour change

- The qualitative findings reveal that behaviour change was more likely at hospitals where motivation among staff was high and social structures existed to support and maintain changes to practice.

- Triangulation of in-depth interview and focus group discussion data with quantitative data on extent of change helped to understand some of the critical factors that influenced behaviour change at the study sites.

- Respected peers and colleagues were influential in facilitating behaviour change, especially at group initiator hospitals. However, it proved difficult to ascertain who the respected peers were, and how they influenced decisions to change. If time and resources allowed, it would be beneficial to conduct in-depth interviews, or use the Delphi consensus technique[1] with labour ward staff to identify local opinion leaders and respected peers, explore in more detail their role and influence and if their roles can be replicated.

- Qualitative findings showed that motivation among staff was an important determinant of change. Further studies might usefully explore the concept of motivation more fully using more appropriate methods. Participatory methods including card sorting or ranking might help engage health professionals in thinking about what really influenced or supported them most in changing their behaviour, and similarly factors that prevented change.

- Qualitative exploration of the setting and organisational environment of the study hospitals would enable further analysis of the influence of organisational factors on decisions to change and performance of the hospital in terms of implementing practice changes.

- These findings suggest common factors associated with health professional behaviour change, but there remains an element of unpredictability in the way individuals and groups interact to effect change. Within the individual complex systems that represent each

study site, elements of that system are 1) adaptable - individuals can choose to change their behaviour or not; 2) non-linear - a small-scale change programme may or may not trigger change; and 3) embedded in an organisational context that might or might not support change.

References

[1] Jones J, Hunter D. Using the Delphi and nominal group technique in health services research. In: Pope C, Mays N [Eds] Qualitative research in health care. London: BMJ Publishing group, 1999.

Chapter 8 Discussion

'If you want to truly understand something, try to change it.'

Kurt Lewin

8.1 Introduction

This research documents a case study from South Africa to implement research findings into practice. This chapter outlines the main findings in relation to the initial research questions (8.2); modifications to the change programme in light of the findings (8.3); what this thesis contributes to current knowledge in implementation research (8.4); findings about the research problem (8.5); implications for policy, practice and research (8.6); and the limitations of the study (8.7). For a discussion about the validity of the study design, see Annex 7.

8.2 Conclusions about research questions

1. **Is a multi-faceted change programme able to effect change in provider behaviour and practice after 6 months?**

Baseline and follow-up data on provider behaviour for marker practices presented in chapter 6 were unable to show a difference in impact between intervention and control sites (section 6.1). However, when all ten study sites were considered together the data indicate practice changes with potential clinical significance, and an increase in the number of maternity units demonstrating good practice (although no change was significant) (section 6.2). The findings demonstrate that behaviour change varied across the study sites; and change was more easily effected for some marker practices than for others. Data analysis facilitated classification of study sites into those where provider behaviour changed for five of more practices, and those where change occurred for four or less practices (section 6.3).

The impact of the change programme on provider behaviour was assessed using a single-group pre-post test design, which precluded a rigorous comparison between study sites that received the educational workshop alone and those that received both the workshop and the self-audit. In addition, the small number of study units in the sample meant the study was underpowered, and therefore unable to detect statistically significant behaviour changes, if they did exist. A large multiple-arm design would have allowed assessment of the effect of both the workshop and the self-audit against controls, and would have detected behaviour change and its statistical and clinical significance more accurately. However, detecting change in practice was not the main aim of this research; rather the focus was on understanding how the change programme operated in practice and the critical factors that influenced change. Appropriate designs for evaluating interventions to change health professional behaviour are discussed in more detail below.

2. What are the social and individual processes associated with change in health professional behaviour and practice?

Quantitative measures of impact on provider behaviour and practice are intended outcomes of a change programme, and are commonly examined in evaluations of change interventions since they reflect the researchers perspective[1]. Less likely to be systematically investigated is the impact on those being affected by a change effort, and the actual processes that enable change to be effected. In this research, categorisation of study sites based on the extent of change (section 6.3) facilitated secondary qualitative analysis, which explored the factors and processes that enabled practice to change at some maternity units, and prevented change at others.

Qualitative findings presented in chapter 7 explored the impact of the change programme on social and individual processes of change. The case studies of change presented in sections 7.2 and 7.3 highlight the importance of both individual and group motivation in realising behaviour change. It was found that the change process an individual passes through is quite distinct from the group interactions that underlie motivation. At study sites where motivation levels were considered high (group initiators and contemplators – see figure 7.3), the narrative findings indicate that individual providers had internalised the concept of evidence-based practice and appeared to progress through defined stages towards adoption of the new ideas presented in the workshop. The narrative data provide evidence of individual understanding of the need to change practice according to the evidence, and that decisions to change were taken based on the information delivered in the workshop. Social processes were also important in supporting attempts to change practice at high motivation sites. Good communication between different levels of staff facilitated the diffusion of new information among all labour ward staff; and there were examples of how groups reached a consensus for change, and employed their own local strategies to ensure changes were implemented.

Conversely, at study sites where motivation was less evident (individual initiators and constants – see figure 7.3) adoption and diffusion process were less well defined. At individual initiator hospitals, the narrative findings suggest that changes to practice were the result of individual efforts to change, rather than group consensus. At hospitals where few changes were implemented, the qualitative data revealed negative attitudes towards the change programme, and suggested changes were made more for convenience than a result of understanding and internalising the new information.

Investigating the impact of the change programme on those actually affected by it was made possible by using qualitative methods that are sensitive to the complex nature of human behaviour and that yield in depth, rich information. The case study approach allowed in depth examination of the complex individual and social processes likely to be responsible for behaviour and practice change at each study site. This approach has highlighted the need for research that evaluates change interventions to integrate quantitative and qualitative methods. Future research might usefully explore motivation more fully, in terms of defining it and how its potential can be harnessed and encouraged to bring about change. Implications for research are discussed further in section 8.5.

3. What is the contribution of complexity theory to implementing change in health professional behaviour?

The case studies in section 7.2 and 7.3 show varying reactions to the change programme at the study sites, and emphasise the difficulty in predicting at which study sites staff members are likely to change. Each labour ward in each study hospital represents a complex adaptive system, and is able to adapt in its own way. The individual and social processes involved in changing or adapting behaviour are uncertain, since non-linear interactions between individuals may or may not result in change. The literature review highlighted the potential contribution of complexity theory to implementation research, and in doing so emphasised the need to identify 'strange attractors' – ideas or concepts that underpin and explain unexpected human behaviour (see box 2.3, chapter 2). These factors determine the motivations behind individual behaviour and once understood, behaviour can be influenced and change initiated within a system.

One way to explore factors that helped to promote change in this study was to examine the characteristics of the change programme. Chapter 5 explored the attributes of the change programme to identify the factors that facilitated decisions to implement the changes. Previous studies have focused on barriers to change, and ways to overcome them during the implementation of a change intervention (see section 2.2, chapter 2), but this approach is of limited value since all barriers are not immediately apparent and may only be manifest during the process of change. In addition, it is useful to look for factors that support change, rather than those that prevent it. This research identified several attributes of the change programme that promoted change, these included: the content of the workshop; the workshop materials; and the way the workshop was conducted and the information delivered.

An interesting finding highlighted in section 5.2, was the perceived risk associated with changing some marker practices. Where barriers were thought to exist (i.e. need for further training, resources or facilities) and where changing practice was believed to disrupt current work routines (companionship, position during labour), changes were not easily implemented. Conversely, where a change in practice was associated with time or cost saving (for enemas, episiotomy, perineal shaving), change was more readily implemented and fewer constraints were discussed. Awareness of health professionals' perceptions of the risks associated with changing practice is key to understanding their motivation to change behaviour and practice.

Similarly, exploring health professionals' perceptions of the content of the educational workshop and the mode of delivery enabled a greater understanding of the factors that motivated individuals to change. Findings in sections 5.3 and 5.4 suggest that the informal and interactive nature of the workshop motivated and empowered individuals and groups to change their behaviour. Narrative data also indicate that the concise format, bright design and uncomplicated content of the reference materials appealed to busy health professionals, and facilitated the transfer of information to colleagues.

These findings imply a degree of consistency with other research, which suggests small group interactive learning is more effective than traditional didactic approaches or interventions that rely on printed educational materials and knowledge transfer (see section 2.2, organic strategies). Educational methods that emphasise the process of change and how to implement practice changes, rather than knowledge and skills, can encourage capability as well as competence. Capability can be enhanced through small group problem based learning, which allows reflection on actions and avoids prescriptive goal oriented tasks. Future strategies for getting research findings used in practice might benefit from adopting new learning techniques that focus on strengthening capability.

4. Which study designs and methods are most appropriate for evaluating implementation research?

The design and methods used to evaluate implementation research depend largely on the research question. This study attempted to answer several questions simultaneously: **if** change happens using a multi-faceted change programme, **how** behaviour change happens, and **why** it happens. To answer each adequately might require different designs and methods.

For instance, to discover if change can be initiated in a given setting, using a specific change programme requires a rigorous experimental design to obtain a measure of clinical impact and detect significant change in real circumstances. Wyatt[2] used this kind of experimental design, to evaluate the impact of educational visits on provider practice and patient outcomes; the study found little effect in these quantifiable outcomes, and failed to explore the processes involved in changing behaviour. If qualitative methods had been used to explore processes of change, perhaps even before the trial, or alongside the quantifiable outcomes, this would have enabled a greater understanding of how the educational visits worked, and how the impact might be sustained.

Freemantle et al used a large, complex, block design to evaluate the effectiveness and efficiency of evidence-based outreach visits to deliver messages from evidence-based clinical practice guidelines[3]. Health authorities (or 'blocks') were randomised to receive either mailed guidelines or outreach visits in four clinical topics. The trial evaluated patient-level outcomes that reflected provider practice and therefore an estimate of change in behaviour; but also included qualitative evaluation of the experience of those delivering the outreach visits using feedback questionnaires and nominal group (or consensus) meetings. Benefits of this type of design over a simple randomised controlled trial include the incorporation of a range of guidelines, thus increasing generalisability, and obtaining data on both the effect of outreach and control dissemination method from individual practices provides a more accurate estimate of effect. The authors also identified a need to explore qualitatively the effects of the intervention, including how outreach visits were delivered and the context and experiences of those receiving them.

In a similar way to the Freemantle trial, this thesis has highlighted the need to consider methods for assessing the effect of the change programme on those receiving it as well as its expected impact on behaviour, and this has led the principal investigator to agree with Mason et al, that,

> 'Unlike much clinical research, which can be regarded as somewhat sterile and formula driven, there is no standard process for the design of implementation intervention trials, and each case must be addressed in the light of the feasible options and their likely implications."[4]

Freemantle and others suggest that implementation research might benefit from paralleling the process used in drug development, where several pre-clinical phases of trials to determine the action and safety of new drugs precede double blind randomised controlled trials in diseased people. Making the distinction between trials that aim to increase understanding of how change interventions operate (explanatory trials), and those that intend to estimate the size of their effects in real settings (pragmatic trials) might overcome the premature evaluation of under-developed and poorly understood interventions in real-life settings[5].

Through qualitative methods and analysis in this study, it was possible to test the underlying theories (organic change, social influence, behaviour change model) and their actual influence on behaviour change, explore the context of change and the effect of attributes of the change programme (content, facilitation, mode of delivery). This study clarifies the importance of such an 'explanatory' research phase, to investigate in depth all critical factors that might influence the effect of the change programme and explain the quantitative data pattern. This research also attempted to evaluate impact on provider behaviour, although the most important outcomes were those relating to how the change programme worked. Explanatory trials also provide the opportunity to test principles of complexity theory, and explore the non-linear interactions and unpredictable events that an intervention might produce and that lead to successful behaviour change[6].

A logical second phase, according to Freemantle, would be to evaluate the change programme in a pragmatic trial, where control of all influential factors is not possible or desirable, but an estimate of the size of the effect of the programme on behaviour is achievable. A pragmatic trial should use a design that is appropriate for estimating effect size; in this case it should be able to compare intervention and control sites and be large enough to detect significant change in health professional behaviour.

8.3 Modifications to the change programme

In the light of both the qualitative and quantitative findings of this research, several modifications could be made to the change programme prior to its implementation in other provinces or on a larger scale.

- **Greater participation of local hospital managers, opinion leaders, experts, and practitioners.** If engaged from the start, a core local group could help ensure the change programme takes account of local priorities and contextual factors. The group could be consulted on priority areas for change, likely barriers to changing practice, and factors that might facilitate use of research findings in practice. The existing programme was developed with input from a variety of international experts, but it lacked sufficient local involvement, which might have better encouraged local ownership of the programme. A core group of local managers, leaders and practitioners who endorsed the principles of the programme could advocate locally as 'change agents', encouraging colleagues to adopt the evidence-based standards promoted by the programme.

- **A more comprehensive assessment at baseline and follow-up, of barriers to change and facilitating factors.** This could include interviews with staff, observations and focus group discussions to identify individual, social and organisational factors that might promote or prevent practice changes. This type of assessment would help to better understand the target group, and delineate their particular needs. As Grol suggests in his discussion of strategies to improve practice, and Parker and Parikh discuss in relation to the preparedness model[7], different problems in implementing change may arise depending on the phase of the change process and preparedness of individuals[8]. Obstacles may relate to 'dissemination' - the target group might not be aware of the latest evidence, or interested in it; or there may be 'adoption' barriers – the target group might not be convinced about the programme because it appears too complex, or interferes with existing modes of practice.

  In this study, some barriers to change (identified retrospectively) were common across the 10 study sites, but some obstacles were specific to individual hospitals. A more thorough evaluation of possible barriers at individual hospitals at baseline would have allowed the PI to adapt the content of the programme and use different approaches, materials or methods to suit the needs of labour ward staff at individual sites.

  Additionally, a more systematic and detailed exploration at follow-up of the context in which the change programme was introduced, using qualitative methods, would yield data that are essential for understanding the organisational factors critical to successful change (see limitations, section 8.7).

- **Focus on areas where change in practice can be easily facilitated.** The extent of practice change following the change programme varied across the study sites, and at no site did practice change for all the marker practices. A baseline assessment of barriers and facilitators, and consultation with a core group of local managers and practitioners, would help to focus efforts to change practice on areas where individual, social and organisational barriers are less apparent. Identifying priorities for change would be facilitated by wider involvement of local representatives; practice changes are more likely to be initiated where the need for change is already recognised locally.

- **More frequent contact with study sites.** One explanation (raised frequently in focus group discussions) for the lack of motivation among staff to carry out the self-audit and to sustain effort in changing their practice was lack of support from the research team. A series of follow-up workshops and/or visits to each site would help to disseminate the evidence-based standards more widely and engage more hospital staff, and ensure continuous communication between the study sites and the research team. Follow-up visits could include an audit and feedback session to monitor changes to practice, and maintain motivation for change.

- **Ensure all levels of staff are present in workshops.** The qualitative findings indicate that practice changes were more easily implemented at hospitals where all levels of staff (midwives, doctors and superintendents) were present at workshops. Subsequent implementation of the programme could make mandatory the participation of at least one doctor and one superintendent, where possible.

- **Identify key contacts at study sites.** Ensuring one or two staff are responsible for co-ordinating the programme at each study site would facilitate communication with the research team. In addition, key staff could collate information on progress with implementing evidence-based standards, and document the dissemination and implementation strategies adopted by staff at the hospital.

8.4 What this research contributes

This thesis contributes to current knowledge in implementation research described in the literature review in the following areas:

Organisational approach: The interpretation of the findings on changing behaviour and practice made little sense using traditional linear, plan and control model, which considers change as an independent event. However, the findings were consistent with an organic model, which acknowledges the role of uncertainty and unpredictable 'trigger' events. Some previous research has assumed a rigid stepwise approach to changing behaviour, with prescribed interventions to overcome pre-identified barriers (section 2.2); and most of this research has been conducted in high-income settings.

Understanding the behaviour change process: An innovative contribution and strength of the research was its attempt to delineate exactly how social and individual processes influence the translation of knowledge into changed behaviour. The theoretical basis of social and behavioural interventions to change health professional behaviour is well documented (section 2.3); but understanding how the change process actually happens requires in-depth investigation. Integrating qualitative research with quantitative measures of impact in the analysis (chapter 7) facilitated understanding of how changes were implemented, and the social and individual processes involved at the study sites.

Using complexity theory: Although still emerging, complexity theory presents the opportunity to explore the uncertain and unpredictable nature of change (section 2.4). This research used the principles of complexity theory as a framework to identify which components or events were associated with change; and explored how these factors influenced the change process (chapter 5). Applying a complexity theory perspective allowed the principal investigator to contextualise the research within what is essentially a complex human environment, and acknowledge the role of non-linear interactions and unpredictable events in effecting change. Where change programmes are implemented in a more rigid fashion, informed by planned change theory, researchers expect to obtain predicted outcomes after controlling the change process through a series of linear steps (see box 2.1, chapter 2). In addition, because of the complex nature of the behaviour change process, change will inevitably be slow. Implementers of change programmes who anticipate an immediate and sustainable impact on behaviour and practice are overly optimistic, and fail to acknowledge the influence of context and the individual and social processes involved.

Resource-poor setting: The literature review identified a dearth of research conducted in resource-poor settings around implementing change in behaviour (section 2.5, chapter 2). There are specific resource reasons why strategies to change health professional behaviour designed and tested in North America or Europe might not apply in an African setting. In particular, this study revealed that staff shortages and consequent rotation of staff make it difficult to introduce and sustain changes to obstetric practice (chapters 5 and 7). Ironically, resource constraints are the most important reason why efforts to change medical practice should be a priority in these settings. This research was conducted in a poor setting in South Africa, and contributes to efforts to discover which strategies for changing health professional behaviour work best in low and middle-income environments.

8.5 Conclusions about the research problem

Using a multifaceted change programme, what factors determine change in health professional behaviour, and what influence do they have on decisions to change?

This research has helped to clarify the critical factors that influence health professional behaviour change. It has explored the theoretical underpinnings of behaviour change, to identify whether the implementation of a change programme in practice actually reflects the processes implied by organisational change, social influence, diffusion of innovation, and behaviour change theories. The findings suggest that:

- Behaviour change does not necessarily happen as planned (as assumed in linear approaches); change programmes or strategies more often than not initiate series of slow, incremental events (organic approaches).

- Not everyone will implement the changes intended by a change programme. Decisions to change behaviour depend on individual readiness and attitude, and on motivation levels within individual hospitals (social interaction, communication, and teamwork are all associated with motivation).

- The context in which a change strategy is implemented needs due consideration. In low and middle income settings access to information and training opportunities, time available to devote to new or additional tasks, staff shortages and rotations all influence feasibility of changing behaviour since they affect motivation and individual capability.

- Programme attributes or characteristics including the content, facilitation method, mode of delivery and cost of implementing will determine whether or not health professionals appreciate and accept the messages being delivered. Health professionals' positive perceptions of the programme attributes are pre-requisite to behaviour change.

8.6 Implications

Implications for policy and practice

- Policy makers and researchers aiming to translate research into practice and implement evidence-based practice should not rely on a linear, planned approach; the change process is more complicated. At the institutional level, change in health professional behaviour happens within a complex human environment dominated by non-linear relationships; it is an unpredictable process that requires time and sustained effort.

- Implementation trials with short follow-up for primary outcomes are unlikely to achieve the expected impact given the complexity of the change process. For example, the WHO trial to evaluate a programme promoting evidence-based medicine based on the WHO Reproductive Health Library[9], aims to follow-up within 10-12 months of conducting interactive workshops at district hospitals. The findings from this study suggest that expected changes to practice might not happen at all study sites within this time frame. Those engaged in trials of interventions to change health professional behaviour should consider the effect of unplanned events throughout the study period and their impact on behaviour, as well as exploring the anticipated impact of the change intervention.

- The context within which the change programme is implemented will affect motivation and likelihood of change. Where possible, existing interactions between staff should be observed, and opinion leaders and change motivators identified before the programme is implemented. The involvement of respected peers and colleagues helps to facilitate behaviour change although it remains unclear how they influence their peers, or if their strategies can be replicated (see implications for research).

- At the individual level, changing behaviour requires motivation, which is directly influenced by the characteristics of the change programme. Strategies for change should focus on individual readiness and attitude to change, and on promoting social interaction, communication, and teamwork, which tend to encourage motivation and therefore probability of behaviour change.

- Characteristics of a change programme are also important influences on health professionals' perceptions of the need to change behaviour and their consequent actions. Where possible, change strategies or programmes should be inclusive, and use interactive components and informal discussion. Materials used in educational workshops or outreach visits should be straightforward and easy for busy health professionals to absorb and use.

Implications for research

The design and methods used to evaluate interventions to change health professional behaviour depend on the specific questions being asked. Evaluation trials to detect changes to practice after a change intervention are often conducted prematurely, with insufficient understanding of how and why a strategy works.

- Those conducting implementation research should consider explanatory trials as a first phase, to clarify critical success factors, before conducting larger pragmatic trials to determine the size of the effect on practice and behaviour.

- Qualitative methods and observational designs are the most appropriate methods for explanatory studies that aim for construct validity. Qualitative methods and analysis facilitate understanding of theory and concepts underlying behaviour change, and how these relate to the operationalisation of an intervention.

- Explanatory trials that explore the role and influence of opinion leaders in effecting change would be useful. It is, as yet, unclear who they are, what they do, or how they influence their peers.

- Explanatory trials to understand more fully the motivation of health professionals to change their behaviour would also be beneficial. Participatory methods might help engage health professionals in thinking about what really influenced or supported them most in changing their behaviour.

- Long term evaluation of the impact of interventions to change health professional behaviour might usefully employ observational audit methods similar to those used by the Leeds maternity audit project to measure levels of, and changes in, compliance with evidence-based recommendations in obstetrics in the UK[10].

- Rigorous syntheses of explanatory studies of change processes would complement existing systematic reviews of randomised trials of the effectiveness of interventions to change health professional behaviour, and help consolidate knowledge and understanding of how programmes or strategies for changing health professional behaviour actually work.

8.7 Study limitations

This section outlines the main limitations of the research presented in this thesis, it includes discussion around the role and influence of the principal investigator (PI) on the research process and the qualitative data collected; an explanation of gaps in the qualitative data on organisational change processes; selection of study sites and participants; and the limitations of the study design employed.

Critical reflection

An important part of assessing the validity of any qualitative research is to critically reflect on the ways in which the researcher and the research process have influenced the data collected; this is commonly referred to as 'reflexivity'[11 12]. What follows is an account of how the qualitative data collected and the conduct of the research project was mediated by the role of the PI, as implementer and evaluator of the intervention, and the influence of her personal characteristics on the relationship with research participants.

The principal investigator (PhD student) was involved in all aspects of the research: data collection at baseline and follow-up, implementation of the educational intervention, and data analysis. This multiple role may have impacted on the reliability of qualitative data collected, particularly as the investigator conducted all in-depth interviews with labour ward staff. An important consideration in this research is that during interviews at follow-up, labour ward staff recognised the interviewer as a facilitator of the workshop. The responses given during interview therefore may be subject to 'courtesy bias' or 'social desirability', that is, the respondent providing answers he or she thinks are acceptable to the interviewer rather than their true opinion[13].

While 'courtesy bias' is a possibility, the investigator is of the opinion that its impact on the validity of qualitative data collected in this study is minimal. Most interviewees had strong opinions, and some provided detailed accounts of why no practice changes had occurred after the workshop; these views were often re-iterated in focus group discussions, thereby enhancing the probable validity of the findings. For those who responded positively, and suggested that the workshop had influenced their practice, frequently there was further tangible evidence that this was the case – workshop posters were displayed on the labour ward, self-audit charts were in use, and consensus in focus group discussions tended to indicate that the workshop had influenced practice.

One way to control for courtesy bias would have been to employ a researcher not involved in delivering the intervention to conduct in-depth interviews with staff at baseline and follow-up. The external researcher's impartiality to the intervention would perhaps have improved the likelihood of respondents talking more openly and honestly about their experiences; conversely, respondents might have been more apprehensive about revealing their views and experiences to an unfamiliar researcher. Funds for this research did not allow for an external interviewer, so the validity of qualitative data collected during in-depth interviews was largely dependent on the interviewer's (principal investigator) probing skills and ability to explore issues in more depth and clarify details with respondents. On reflection, some interview transcripts do highlight areas where the interviewer could have probed further or followed up remarks made by the respondent; this inevitably affects the quality and validity of the qualitative findings presented.

The influence of the personal characteristics of the researcher on the conduct of the research project is also an important consideration. Being young, female and European did create a distance between the PI and the research participants in a middle-income African setting. The social and cultural distance was most apparent when the PI helped to facilitate workshops; some participants were sceptical of the workshop and the rationale for it, and some viewed it as an externally driven initiative of little relevance to them. Joint facilitation with Dr Brown, a well-known and respected peer in hospitals throughout the province, helped to reconcile this and encourage hesitant participants. However, at hospitals where few practice changes occurred, it is possible that the social and cultural distance between the investigator and the labour ward staff had an influence on their decision not to change practice.

In the same way as the dual role of the PI in providing and evaluating the initiative can affect the accuracy of responses, the personal characteristics of the investigator might also affect the way interviewees respond and answer questions during face-to-face interviews. It is possible that the social and cultural distance between the PI and the respondents affected the responses provided during in-depth interviews, especially from those participants who were less supportive of the workshop and viewed it as an external initiative. However, as discussed above, the PI is of the opinion that most interviewees provided honest responses; interview transcripts provide evidence of a range of views, not just positive evaluations. In addition, data from interviews was triangulated with focus group discussion findings and corroborating tangible evidence, which seemed consistent with responses given during interviews.

Gaps in qualitative data on organisational change processes

During the educational workshops at the 10 study sites, various options for helping staff to change practice were discussed. Five study sites received the self-audit mechanism to encourage monitoring of any practice changes, but no rigid strategy was enforced at the other sites; staff were free to decide how best to disseminate the information and encourage their colleagues to incorporate evidence based standards in their practice within their individual settings. Key studies included in the literature review highlight the possible influence of the organisational 'context', or the environment in which a change is implemented, on the success of a change programme. Exploring the context of change is therefore considered an important component of implementation studies that attempt to delineate critical success factors.

A limitation of this research is that data on the specific dissemination and implementation strategies adopted by staff at the sites was not formally collected, and the qualitative data collected does not allow the investigator to elaborate on the influence of the environment in which the change programme was implemented. The qualitative methods employed at follow-up focused primarily on exploring individual processes of behaviour change and did not systematically explore the organisational context of practice changes. During individual interviews and group discussions at each study site, the investigator did ask participants about any practice changes implemented since the workshop, but failed to probe and question sufficiently about how change occurred within the labour ward setting, and the specific influence of factors within the organisational environment.

The qualitative findings in chapter 7 do demonstrate where good communication, teamwork and interaction among staff helped to build consensus for change and fostered innovate ways to ensure implementation of practice changes. In particular, staff at one hospital initiated a new internal policy for shaving women and incorporated evidence based standards in their existing committee for support during childbirth. However, this information was communicated in a rather ad-hoc way during focus group discussions and in-depth interviews with staff, rather than through a more rigorous data collection process.

A more systematic examination of the individual hospital settings (context) in which practice changes were implemented, perhaps through individual interviews with key staff from various levels (including hospital managers, superintendents and labour ward staff), strengthened with observational research on the day to day workings of the hospital environment, would have generated important data on processes of organisational change and the institutionalisation of practice changes. For example, had qualitative methods been used to explore the 'culture' of the hospitals and labour wards, this would have allowed an insight into the general morale prevailing at the study sites, decision-making processes, and the importance of people and social interactions in effecting change. In addition, exploration of the organisational structure within the hospitals, using in-depth interviews with key staff, would have allowed a greater understanding of the working environment, staffing levels and rotations, working relationships including teamwork, social norms, and leadership roles and how these factors influenced the extent of practice change at the study sites.

While the qualitative findings do provide anecdotal evidence, communicated informally, of the influence of cultural and organisational factors on effecting changes to obstetric practice, a more systematic and detailed exploration of the context in which the change programme was introduced would have yielded important data, and strengthened the evidence around factors critical to successful change. For example, had data on organisational context been collected, this would have strengthened the analysis in section 7.5 and helped to identify the organisational processes of change that lead to implementation of practice changes.

Selection of study sites and participants

The research was conducted at ten purposefully selected government hospitals in Gauteng province, within 200kms of Johannesburg. The small sample size used and the fact that the research was conducted in one (predominantly urban) province means the study sites cannot be considered representative of maternity units in other provinces (especially in more remote areas). However, given the standard structure and management of government hospitals in South Africa, the results describing practice changes from baseline to follow-up can be taken as indicative of the likely impact at hospitals in other provinces. This research was a 'pilot' or phase one study to evaluate a newly developed strategy for influencing practice; it was inappropriate in this early phase to include more study sites or conduct a cross-province comparison.

Exit interviews with postnatal women were used to document rates of use for marker practices at baseline and follow-up. Because the intervention had not been tested previously, it was difficult to estimate the size of the effect of the workshop intervention on practice; time and resources available therefore determined sample size. The main limitation of this approach is that the small sample size lacked power to detect a significant difference in practice rates from baseline to follow-up if one was really present (type II error)[14].

Convenience sampling was used to select participants for focus group discussions at follow-up; participants included those who attended the educational workshop and were available on the day. High staff turnover and staff shortages precluded a more representative sample, which might have included a range of staff of different levels. However, one benefit of conducting focus group discussions on the labour ward was that the groups were 'naturally occurring', or at least approximated teams that usually work together; group discussion and interaction was therefore enhanced by familiarity and shared daily experiences.

One or two key staff were purposefully selected for in-depth interview at follow-up. The initial plan was to interview different levels of staff, but the actual sample included mainly midwives due to their immediate availability. Had the sample been more representative, and included viewpoints from doctors, superintendents and midwives, the findings might have detected a wider range of views and experiences of the educational intervention.

Study design

The research used an uncontrolled (or one-group) before and after design, which measured practice rates and provider behaviour before and after the educational workshop intervention; in this design observed differences are usually assumed to be due to the intervention. However, this quasi-experimental design has inherent weaknesses that fail to rule out a number of plausible alternative explanations for the observed differences between baseline and follow-up. Annex 7 documents the influence of history, selection, maturation and instrumentation and the potential effect of each on the internal validity of the findings. These factors are inevitably present in any social science field research conducted in a complex human environment, where people and conditions change over time. Because these factors cannot be controlled for in a one-group before and after study, the findings presented in this thesis must be interpreted with caution; participants' willingness, ability and attempts to change their behaviour and clinical practice could have been the result of influences external to the study and nothing to do with the educational intervention[15].

However, because the study was conducted over a relatively short time period, was a pilot test of the intervention, and had a short pre-post test interval, a causal link between the educational intervention and demonstrated differences in practice rates between baseline and follow-up can be inferred, even if the hypothesis is not able to be fully tested using this design. A strength of this research was the use of qualitative methods to further explore the trends identified in the pre- and post- intervention data. Alternative designs are discussed in section 8.2.

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[15] Cook TD, Campbell DT. Quasi-experimentation: design and analysis issues for field settings. Chicago: Rand McNally Publishing, 1979.

Annex 1

A1.1 Search methods

Databases searched

Regular literature searches were conducted between September 1999 and May 2002.The main databases searched were Medline (1966-present), Embase (1980-present), the Cochrane Library (Issue 2, 2002).

Key words used in search strategies, either singly or in various combinations, included: implementation/implement, strategy/strategies, framework(s), clinical/clinician, professional behaviour/behavior, behaviour change/change, intervention, evidence/evidence based medicine.

Selection process

Titles and abstracts (where available) were scanned; potentially relevant abstracts were downloaded and full text articles obtained. Reference lists or bibliographies of retrieved articles were scanned for further relevant articles. References were stored and managed in ProCite.

Search process

After retrieving papers relevant to implementing change in health care and changing health professional behaviour it was apparent that management and organisational change literature would offer further insight into the theory behind change strategies. I consulted major texts on organisational change[1 2 3 4], and an introductory text on organisation theory, which described key theorists and their approaches[5]. I also hand searched the Harvard Business Review and Sloan Management Review for articles relevant to managing change, managing people and transforming organisations. The Journal of Health Services Research and Quality and Safety in Health Care were also

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[1] Plant R. Managing change and making it stick. London: Harper Collins, 1991.

[2] Handy C. Understanding organisations. London: Penguin Books, 1999.

[3] Beckhard R, Harris R. Organisational transitions: Managing complex change. Reading, MA: Addison Wesley, 1977.

[4] Kanter RM. The change masters. New York: Simon and Schuster, 1983.

[5] Pugh DS (Ed). Organisation theory: selected readings. London: Penguin Group, 1997.

useful sources of research on managing change in clinical practice, changing health professional behaviour, and implementing change in health care settings.

Subsequent electronic searches used the following key words: organisation(s) /organisational, change, organisational development, management/managing, behaviour.

Later on in the process of writing up, debate around the application of complexity theory to health care was emerging in the key journals mentioned above. In particular, a series in the British Medical Journal on 'complexity in health care'[6] [7] [8] and a formative paper by Grol on understanding the science of change[9] helped to put in context some of the findings emerging from my own research. It seemed relevant to include a discussion around the potential contribution of complexity theory to research around the 'black box' of change in health care organisations.

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Annex 2

A2.1 Continuous quality improvement applied to health care

Lomas points out that there has been an extensive conversion of health care facilities to the industrial quality management process of quality improvement (CQI)[10]. CQI involves fostering an evaluative culture within an organisation, recognising individuals as components of a system, and empowering them to make changes at the grass roots level[11]. This section provides an overview of the application of continuous quality improvement principles to improvement in health care systems.

Greenhalgh maintains that CQI can be applied to the improvement of health care and the systems for delivering it using the familiar stepwise approach: convening a multidisciplinary team of health care staff; identifying the problem; developing guidelines to solve the problem; considering barriers to implementation; implementation; and measuring performance[12]. However, the approach is highly prescriptive and rests on several assumptions; that health care providers will accept there is a problem with current practice, that guidelines are the best way to initiate change, and that the barriers identified will easily be overcome and the guidelines accepted and used in practice. Grol presents a similar model of changing clinical practice that appears to be based on the concept of continuous quality improvement[13]. He proposes developing a change proposal, identifying obstacles to change, linking interventions to obstacles, developing a plan, and carrying out the plan. He presents this as a cyclical process, where progress is continually evaluated and fed back in to the initial steps. A key component of the approach is the identification of obstacles to change and interventions that are linked to specific obstacles. While this is a useful approach, it assumes that obstacles are apparent and predictable in advance of implementing a change effort, and that implementation will progress as planned once troublesome issues are addressed. Continuous quality improvement programmes like this could be viewed as Handy's 'continuous' change[14] in action; the danger is that people involved in this strategy become too familiar with the process and expect things to happen without effort.

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[10] Lomas J. Teaching old (and not so old) docs new tricks: effective ways to implement research findings. In: Dunn EV, Norton P, Stewart M, Tudiver F, Bass MJ [Eds]. Disseminating research/changing practice. Thousand Oaks, CA: Sage Publications Inc., 1994.

[11] Greenhalgh T. How to read a paper. London: BMJ publishing, 1997

[12] Greenhalgh T. Op.cit.

[13] Grol R. Beliefs and evidence in changing clinical practice. British Medical Journal 1997;315:418-21.

[14] Handy C. Understanding organisations. London: Penguin Books, 1999.

Significant change can therefore rarely be expected to happen unless prompted by an unexpected event.

Geboers et al describe a model for continuous quality improvement in small-scale (general) practices and use examples from a study in the Netherlands to illustrate the model[15]. They describe core elements of CQI as: a leading role of management, actions based on factual data, a systematic approach, and close collaboration among all involved in the quality improvement effort. Their framework for improvement in small practices included: regular practice meetings with all staff, designating a quality co-ordinator (leader), developing annual plans for CQI, and annual reports on quality improvement activities and results. Results from a small feasibility study show that the model seems feasible; but the authors caution that introducing a CQI programme requires considerable facilitation from outside to help individuals incorporate CQI into existing routines, and establish and run improvement cycles. They question whether the benefits of CQI are equivalent to the effort required in promoting the method among practitioners. It is reasonable to assume that a similar amount of effort would be required to promote the use of CQI programmes in areas other than general practice.

Lawrence and Packwood evaluated the use of a quality improvement programme in 18 general practices in Oxfordshire, UK[16]. Selected practice members attended a course in total quality management (where a CQI programme based on multi-disciplinary teamwork was introduced), and were expected to introduce the methods to their colleagues. Each practice then moved through the CQI process – establishing topics and problems, identifying solutions, implementing the best solutions and evaluating within one year. The results show that 16 of the 18 practices implemented CQI projects, and 11 practices planned to continue with the method. The authors suggest common problems with implementing CQI in primary care were hierarchical structure with doctor-owners limiting the freedom of other staff to implement change, limited staff to dedicate to quality improvement, and absence of a reward system for quality in general practice. While specific to small general practices, some of these barriers – the hierarchical system in particular – might also be relevant in other healthcare settings where doctors are traditionally regarded as decision makers.

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[15] Geboers H, Grol R, van den Bosch W, van den Hoogen H, Mokkink H, van Montford P, Oltheten. Quality in Health Care 1999;8:43-48.

[16] Lawrence M, Packwood T. Adapting total quality management for general practice: evaluation of a programme. Quality in Health Care 1996;5:151-8.

Hearnshaw et al evaluated a continuous quality improvement programme applied to 10 primary healthcare teams in Leicestershire, UK[17]. The programme was presented to each practice team in seven monthly meetings, and included elements of leadership, strategic planning for quality, information about quality problems, analysis of obstacles and methods to overcome them, and using teamwork to enhance the process of change. The findings show that six out of the ten teams started the programme; five of these completed their CQI projects but only three completed all sessions in the programme. The authors conclude that a CQI programme can be acceptable, effective and feasible, but not for every healthcare team. They attribute success to several key characteristics of teams: commitment and leadership from the top, collaboration between team members and consensus decision-making. The authors are justified in suggesting further research is needed to define the characteristics of teams successful at implementing and sustaining CQI efforts.

It is clear from these evaluations that the CQI approach does incorporate principles of an effective behaviour change initiative – it fosters ownership, involves teamwork, and regards implementation as a process; but the process is time and cost intensive. Implementing continuous improvement also necessitates a change in working culture where improving care is regarded as a continuous aim; this can only be achieved with commitment from all involved, teamwork, shared responsibility, and good leadership. Approaches like this pose new management problems; joint decision-making and teamwork might be unfamiliar to clinicians used to traditional hierarchical systems. Additionally, good leadership (demonstrated by respected peers) is necessary to promote new ways of learning. CQI approaches also depend on the willingness of individuals to change and take on extra activities, often with no reward for doing so.

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[17] Hearnshaw H, Reddish S, Carlyle D, Baker R, Robertson N. Introducing a quality improvement programme to primary healthcare teams. Quality in Health Care 1998;7;200-208.

Annex 3

A3.1 Calculations

Change from baseline was calculated using relative risk (RR – 1); where one cell count was zero, 0.5 was added to each cell, a method suggested by Gant and Zweifel (see figure A3.1)[18].

Figure A3.1Calculating relative risk and confidence intervals

Relative Risk is defined as follows:

	Baseline	Follow-up
Cases	a	b
Non-cases	c	d
	a + c	b + d

Relative Risk = [a/(a+c)] / [b/(b+d)]

Change from baseline = RR – 1

Calculating confidence intervals:

Var (lnRR) = [1/a – 1/a+c] + [1/b – 1/b+c]

SE (lnRR) = √ Var (lnRR)

Lower, upper intervals = lnRR ± [1.96 x SE (lnRR)]

Lower interval = exp (lower) –1

Upper interval = exp (upper) –1

A3.2 Outcome tables

Tables A3.1-A3.7 (on the following pages) present data from exit interviews conducted with postnatal women at baseline and follow-up. All data are for normal vaginal deliveries only; data for all other delivery types were excluded from the analysis.

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Table A3.1 Change in the percentage of women able to move around during labour (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% increase from baseline[2] (95%CI)**
A	Leratong	5/23 (21.7)	9/29 (31.0)	0.5388	+9.3%	42.7 (-45, 266)
B	Chiawelo	7/33 (21.2)	5/30 (16.7)	0.7535	-4.5%	-
C	Yusuf Dadoo	13/28 (46.4)	12/29 (41.4)	0.7921	-5.0%	-
D	Pholosong	14/30 (46.7)	14/22 (63.3)	0.148	+16.9%	36.3 (-17, 123)
E	Carletonville	4/16 (25.0)	8/15 (53.3)	0.1489	+28.3%	113 (-19, 463)
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% increase from baseline[2] (95%CI)**
F	Far East Rand	6/22 (27.3)	9/19 (47.4)	0.2115	+20.1%	73.6 (-25, 297)
G	Heidelberg	3/14 (21.4)	5/10 (50.0)	0.2038	+28.6%	133 (-28, 657)
H	Koponong	12/28 (42.9)	5/21 (23.8)	0.2291	-19.1%	-
I	Natalspruit	17/27 (63.0)	11/16 (68.8)	0.7523	+5.8%	9 (-30, 69)
J	South Rand	8/26 (30.8)	11/24 (45.8)	0.3832	+15.0%	48.9 (-28, 206)

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.2Change in the percentage of women able to obtain a drink during labour (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% increase from baseline[2] (95%CI)**
A	Leratong	1/23 (4.3)	7/29 (24.1)	0.0635	+19.8%	455.1 (-26, >500)
B	Chiawelo	6/33 (18.2)	2/30 (6.7)	0.2609	-11.5%	-
C	Yusuf Dadoo	12/28 (42.9)	4/29 (13.8)	0.0195	-29.1%	-
D	Pholosong	3/30 (10.0)	4/22 (18.2)	0.4385	+8.2%	81.8 (-55, 628)
E	Carletonville	1/16 (6.3)	2/15 (13.3)	0.5996	+7.0%	113.3 (-78, >500)
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% Increase from baseline[2] (95%CI)**
F	Far East Rand	4/22 (18.2)	8/19 (42.1)	0.1677	+23.9%	131.5 (-18, >500)
G	Heidelberg	1/14 (7.1)	1/10 (10.0)	> 0.9999	+2.9%	40.0 (-90, >500)
H	Koponong	10/28 (35.7)	7/21 (33.3)	> 0.9999	-2.4%	-
I	Natalspruit	4/27 (14.8)	1/16 (6.3)	0.6354	-8.5%	-
J	South Rand	5/26 (19.2)	6/24 (25.0)	0.738	+5.8%	30.0 (-54, 271)

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.3Change in the percentage of women allowed a friend or family member with them during labour (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% increase from baseline[2] (95%CI)**
A	Leratong	0/23 (0.0)	0/29 (0.0)	-	-	-
B	Chiawelo	0/33 (0.0)	0/30 (0.0)	-	-	-
C	Yusuf Dadoo	1/28 (3.6)	14/29 (48.3)	0.0002	+44.7%	1252 (90, >2000)
D	Pholosong	0/30 (0.0)	4/22 (18.2)	0.027	+18.2%	1118 (-31, >2000)
E	Carletonville	1/16 (6.3)	1/15 (6.7)	> 0.9999	+0.4%	6.6 (-93, >1000)
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% increase from baseline[2] (95%CI)**
F	Far East Rand	2/22 (9.1)	7/19 (36.8)	0.057	+27.7%	305 (-6, >1000)
G	Heidelberg	1/14 (7.1)	0/10 (0.0)	> 0.9999	-7.1%	-
H	Koponong	6/28 (21.4)	10/21 (47.6)	0.0697	+26.2%	122.2 (-5, 409)
I	Natalspruit	0/27 (0.0)	2/16 (12.5)	0.1329	+12.5%	764 (-55, >2000)
J	South Rand	6/26 (23.1)	12/24 (50.0)	0.0765	+26.9%	116.7 (-3.7, 384)

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.4Change in the percentage of women given an ENEMA (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
A	Leratong	11/23 (47.8)	2/29 (6.9)	0.001	-40.9%	86.0 (40, 96)
B	Chiawelo	23/33 (69.7)	19/30 (63.3)	0.6057	-6.4%	9.2 (-36, 29)
C	Yusuf Dadoo	18/28 (64.3)	4/29 (13.8)	0.0001	-50.5%	78.6 (44, 91)
D	Pholosong	15/30 (50.0)	1/22 (4.5)	0.0006	-45.5%	91.0 (36, 98)
E	Carletonville	0/16 (0.0)	0/15 (0.0)	-	-	-
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
F	Far East Rand	1/22 (4.5)	0/19 (0.0)	>0.9999	-4.5%	62 (-98, 785)
G	Heidelberg	7/14 (50.0)	4/10 (40.0)	0.6968	-10.0%	20.0 (-68, 101)
H	Koponong	20/28 (71.4)	12/21 (57.1)	0.3697	-14.3%	20.0 (-48, 23)
I	Natalspruit	1/27 (3.7)	0/16 (0.0)	>0.9999	-3.7%	45 (-98, >1000)
J	South Rand	8/26 (30.8)	4/24 (16.7)	0.3269	-14.1%	45.9 (-81, 55)

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.5Change in the percentage of women being SHAVED for delivery (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
A	Leratong	3/23 (13.0)	0/29 (0.0)	0.0801	-13.0%	89 (-99, 108)
B	Chiawelo	1/33 (3.0)	0/30 (0.0)	>0.9999	-3.0%	60 (-98, 821)
C	Yusuf Dadoo	3/28 (10.7)	1/29 (3.4)	0.3525	-7.3%	67.9 (-96, 189)
D	Pholosong	1/30 (3.3)	1/22 (4.5)	>0.9999	+1.2%	-
E	Carletonville	0/16 (0.0)	1/15 (6.7)	0.4839	+6.7%	-
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
F	Far East Rand	1/22 (4.5)	0/19 (0.0)	>0.9999	-4.5%	58 (-98, 868)
G	Heidelberg	9/14 (64.3)	1/10 (10.0)	0.0129	-54.3%	84.4 (0.3, 98)
H	Koponong	19/28 (67.9)	2/21 (9.5)	<0.0001	-58.4%	85.9 (46, 96)
I	Natalspruit	0/27 (0.0)	1/16 (6.3)	0.3721	+6.3%	-
J	South Rand	3/26 (11.5)	2/24 (8.3)	>0.9999	-3.2%	27.8 (-87, 294)

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.6Change in the percentage of women given an EPISIOTOMY for delivery (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
A	Leratong	9/23 (39.1)	9/29 (31.0)	0.5711	-8.1%	20.7 (-62, 66)
B	Chiawelo	8/33 (24.2)	5/30 (16.7)	0.5423	-7.5%	31.3 (-75, 86)
C	Yusuf Dadoo	10/28 (35.7)	8/29 (27.6)	0.5765	-8.1%	22.8 (-64, 66)
D	Pholosong	10/30 (33.3)	2/22 (9.1)	0.0511	-24.2%	72.8 (12, 93)
E	Carletonville	0/16 (0.0)	2/15 (13.3)	0.4848	+13.3%	-
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (CI)**
F	Far East Rand	6/22 (27.3)	6/19 (31.6)	>0.9999	+4.3%	-
G	Heidelberg	4/14 (28.6)	2/10 (20.0)	>0.9999	-8.6%	30.0 (-84, 210)
H	Koponong	11/28 (39.3)	5/21 (23.8)	0.3585	-15.5%	39.4 (-75, 46)
I	Natalspruit	5/27 (18.5)	1/16 (6.3)	0.3859	-12.2%	66.6 (-96,156)
J	South Rand	4/26 (15.4)	11/24 (45.8)	0.0302	+30.4%	-

Note: [1] Fisher's exact test [2] (post / pre) –1

Table A3.7Change in the percentage of women in SUPINE position for delivery (normal vaginal deliveries)

Intervention sites (workshop + self-audit)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (95%CI)**
A	Leratong	23/23 (100)	29/29 (100)	-	0	-
B	Chiawelo	33/33 (100)	30/30 (100)	-	0	-
C	Yusuf Dadoo	28/28 (100)	29/29 (100)	-	0	-
D	Pholosong	30/30 (100)	22/22 (100)	-	0	-
E	Carletonville	16/16 (100)	15/15 (100)	-	0	-
Control sites (workshop)						
ID	**Hospital**	**Before (%)**	**After (%)**	**P value[1]**	**Absolute change**	**% reduction from baseline[2] (CI)**
F	Far East Rand	22/22 (100)	19/19 (100)	-	0	-
G	Heidelberg	14/14 (100)	9/10 (90.0)	0.4167	-10.0%	10.0 (-26, 10)
H	Koponong	28/28 (100)	20/21 (95.2)	0.4286	-4.8%	4.8 (-13, 5)
I	Natalspruit	27/27 (100)	16/16 (100)	-	0	-
J	South Rand	25/26 (96.2)	23/24 (95.8)	>0.9999	-0.4%	0.4 (-10, 12)

Note: [1] Fisher's exact test [2] (post / pre) -1

Annex 4

A4.1 Primary qualitative analysis

Thematic frameworks for analysing the qualitative data were devised using the framework approach[19] and principles of grounded theory[20]. A priori areas of questioning, emergent and recurrent issues and relevant theories from the literature were integrated to produce a coding index (see boxes A4.1-4 below) that was applied to the complete data set (section 4.5, chapter 4 details the full data analysis process).

A4.2 Thematic frameworks and coding index

Box A4.1 Individual processes of change

Areas of questioning/emergent themes	Coding index
	Individual processes of change
How did providers first react to the initiative? What were reasons for this reaction? Reactions based on fear or enthusiasm	1.1 Initial reactions Positive Negative
How did providers understand the principles of EBM? What were their opinions about evidence-based practice? Perceived need to change Feasibility of changing practice	1.2 Internalising Attitudes Beliefs Knowledge, understanding
What influenced decisions to change practice? Impact of the workshop on changes What role did the workshop play?	1.3 Decision to change Key influences Motivation
What changes took place following the workshop? How did practice change? Was this an individual activity, or all staff involved? Why did practice change?	1.4 Attempting change Experimentation Comparisons

[19] Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess RB [Eds]. Analysing qualitative data. London: Routledge, 1994.

[20] Glaser BG, Strauss AL. The discovery of grounded theory. Chicago, IL: Aldine, 1967.

Box A4.2 Social processes of change

Areas of questioning/emergent themes	Coding index
	Social processes of change
What happened after the workshop? Did you discuss with colleagues? Were workshop materials used on ward/with colleagues? Ward environment, interaction	1.5 Diffusion of ideas Communication Social interaction
How did you manage to bring about change in your labour ward? Influence of 'Dr Brown' as role model, any other respected peers Evidence of teamwork or working relations between docs/midwives?	1.6 Social structure Role models Social norms Working relations
Context of delivery	2.1 Organisational environment: Staff rotation, shortages Resistance to change

Box A4.3 Attributes of change programme

Areas of questioning/emergent themes	Coding index
Target procedures	1.1 Disruption to work 1.2 Physical constraints
Vehicle for communication	2.1 Workshop: need and relevance 2.2 Materials: content and relevance
Mode of delivery	3.1 Atmosphere 3.2 Presentation 3.3 Facilitators

Box A4.4 Evaluating the self-audit mechanism

Areas of questioning/emergent themes	**Coding index**
Views about audit mechanism Did they find any benefits of audit? Was the audit used by staff on the ward? Reasons for use/ non-use? What helped providers to implement the audit What prevented use of audit? Views around support from research team	1.1 Effectiveness Motivating influence Visual communication of changes to practice 1.2 Constraints Staffing issues Lack of communication/ feedback

Annex 5

A5.1 Matrices used in the primary qualitative analysis

Four matrices were constructed as part of the primary qualitative analysis, one for each major theme: individual processes of change; social processes of change; attributes of the change programme; and evaluating the self-audit. The matrices are presented below.

MATRIX 1. Individual processes of change				
Hospital ID	**Initial reactions**	**Internalising**	**Deciding to change**	**Attempting change**
High change				
Hospital A	'It was something different. It tells you, it's really scientifically clear that really this is what you must do. Especially in obstetrics, we are not quite sure...it can be written in books do it like this, practical standards, but the books they do not tell you the truth. So it was quite a challenge whether to believe it or not. But like I said, we practice whatever we can practice in our facilities, given the environment we work in, so it can help us a lot.' (Medical Officer, hospital A) 'I was happy, because at least it was enlightenment to move on from the old practice.' (Midwife, hospital A)	'Yes, its necessary to change practice...because some of the things that you have done might not be useful or beneficial now.' (FGD hospital A) 'I always like to learn. I don't like to be redundant, I don't like to be stuck with some procedures that have been done away with a long time ago. I like to keep up to date, up to standard, with the rest of the institutions, especially in terms of the latest service delivery.' (FGD hospital A) 'Change is difficult, you can't just jump in when you are used to doing something.' (FGD hospital A)		'I tried to compare my findings with the research, because I've been using the enema, I said to myself, let's see what happens.' (FGD hospital A) '...for instance, I was on call last night and I delivered a breech and a primap, and we didn't do any episiotomies. I had an argument with my midwife and said, "no, only give when its necessary" and this one wasn't necessary. So if we don't do, at least we know that what we do is the right thing.' (Doctor, hospital A) 'I have learnt a lot about the necessity of doing something from the workshop. And then I compared to my practice. Before I would do them all the time, like routine episiotomies to all patients, and shaving for all women.' (FGD hospital A)
Hospital F	'I didn't know anything about it before you came here obviously. It was interesting that there is actually someone looking after these things, so we can improve patient care. I'm absolutely for this.' (Medical Officer, hospital F)	'...I mean its changing, in the old times we believed some things that are already being proved wrong. Now maybe we are doing some things that's going to be proved wrong in a year's time and we would like to know that. We don't want to keep doing the wrong thing.' (FGD hospital F)	'Episiotomies, usually its, we don't perform them anymore. From before the, this workshop they were routinely performed.' (FGD hospital F) 'It was after the workshop, we didn't stop ourselves doing shaving. It was after the workshop.' (FGD hospital F) 'Yes, I don't think it was anything else, it was just after your workshop, we never did it.' (FGD hospital F)	'We don't give them [enemas] as routine...and we don't really have any problems. I once had a problem with a full rectum...so I actually put my fingers inside, emptied the rectum and that was the end of the problem. It's not really worth doing a whole enema for that.' (FGD hospital F)

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
High change				
Hospital G	'My reaction, I will translate, was not good. But I can see that when I come back [from maternity leave] I must start practising these things. But the first time, I want to tell you it was not good…I felt that, you know, some of the things were not necessary. That's what I felt, but then I didn't think about it.' (Midwife, hospital G)	'It keeps you on your toes and er, you are kept informed of what is happening in your practice. I think in every work situation it is necessary to update yourself, you can't just carry on.' (FGD hospital G) '…if you introduce change, you must introduce bit by bit, not just many things at a time…you can change with one thing, but you can still get left behind with some things.' (FGD hospital G)		'I used to do episiotomy and at the workshop I was told we mustn't do. Then I went outside to seek some more information [and asked women] "Did they do episiotomy on you?"…most of them said yes and "its painful even now". So I said I'm not going to cut them anymore, rather let them tear.' (Midwife, hospital G)
Hospital D	'Really it was an eye opening to us…we really recognised that most of the things we really should just cut off and hence we did. And the people [at the workshop], they took it very positively.' (Midwife, hospital D)	'I think people, when they have to change, they should really ask themselves the positive side and the negative, the disadvantages and advantages and one thing is really just to adapt to the change.' (FGD hospital D)	'After that meeting we had [the workshop] we are not giving all the patients the enema. There were some that needed it, but after that meeting we respected not giving the patient the enema…then we found that this was unnecessary, because the woman would deliver whether given an enema or not…' (FGD hospital D) 'After the workshop we just altered positions. So with the various positions the patient won't tear…the positions are better so it is unlikely that she will tear, if it does, we can suture it.' (FGD hospital D) '…on intravenous infusions for delivery, whereby it was routine each and every patient in labour gets intravenous fluids. And then in the workshop…we should give fluids…so the workshop really in fact helped us because we no longer use IV lines unless we feel it is really necessary.' (FGD hospital D)	

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
Hospital D (cont)			'Yes, shaving was a routine, and when we are preparing patients for theatre that's one situation that we did it straight away. So, after the workshop we realised that shaving is not necessary...' (FGD hospital D) '...there are others who are giving the enemas and others who are not giving. And the people giving didn't have a reason why they were giving enema and why they are not. So after the workshop it has given them reasons.' (FGD hospital D) 'What I liked most was, as I said, we are practising some practices without knowing why we are doing it. Like for instance the enemas, we are doing it for the sake of doing it, but nobody said you must just give enema...the workshop sort of gave us questions, 'why are you doing that?', 'do you benefit from what you are doing or is it just a waste of time?'. As I said, with the workshop we really realised it was cost effective with the resources too.' (Midwife, hospital D)	
Hospital J	'I thought it wasn't going to be possible, especially with episiotomy, the things we are used to using in the ward. And with the enemas, we thought, oh god, I'm going to have all those big stools!...but after experiencing it I think its easy.' (Midwife, hospital J)	'I think this is very good, about what is enema, shaving is unnecessary, things that we did do before, we now perhaps have to change. So now we don't have to be resistant anymore.' (FGD hospital J)	'...not routinely, but you know, performed. But now I see the very same people who were actually you know, performing those episiotomies are no longer performing them like that. So, we can see that the workshop has changed them.' (FGD hospital J)	

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
Hospital J (cont)		'You find there are so many changes going on over the years, and then you find that we are still sticking to the old things that we are doing before. But as things are being introduced we get used to them, we find life is easier and time is saved.' (Midwife, hospital J)	'...but at the moment I think, maybe it is because of your workshop that it is no longer done, because we don't give it anymore [enemas].' (FGD hospital J)	
Low change Hospital B	'My first impression was, OK let's hear about it...it made us inquisitive. And to know what is this new thing, what are the new things you are talking about? ...You know, my feeling its like first I wanted to know what is this new birth initiative, what is it all about? The changes that are there, lets hear about them.' (Midwife, hospital B) 'At first I was not with the idea. I didn't quite like it, you know. I do not want something that is going to put me in a class. I thought maybe that this is something that is going to take me back to a situation whereby I was in a class and I'm going to be taught this, and at the end of the day I'm going to be asked questions or somebody is going to make me write an exam. I thought it that way, but only to find out as time goes on that it was simple, but was quite informative and educative.' (Midwife, hospital B)	'...this workshop wants us to discard so many things...some of them are acceptable, they are good, some are not. So I think its going to take a long time to do away with enemas.' (FGD hospital B) 'We shouldn't change for the sake of changing...you know, like things that really need changed...there needs to be a good scientific reason.' (FGD hospital B) 'In fact, we were uncomfortable with pounding on us everything we must do, not knowing are we satisfied? Yes, it was imposing on us.' (FGD hospital B) '...the people who are exposed to this [change] is us, on the ground. So we need to be consulted.' (FGD hospital B) 'Ja, like the new information means there is some research that has been done, the scientific information is there, then, like you know, old habits, we are in our comfort zones' (FGD hospital B) 'Yes, attitudes to change, as I say, some of us would rather stay in our comfort zones.' (Midwife, hospital B)	'...like most of the deliveries I've made now, I didn't do the enema. But not because of choice, I was pressed for time, the patient was already very advanced in labour.' (FGD hospital B) 'Yes, its good to learn that we can do without those things, its time saving, it saves time, energy and resources.' (Midwife, hospital B) 'OK, the workshop, it made one to not think along just one thing...the workshop has helped us, it has just taught one just to think broadly. That we shouldn't just...there is a reason for everything.' (FGD hospital B) 'You know, honestly, nothing has changed, nothing much has changed. But now it has created an awareness of certain things we are doing.' (Midwife, hospital B)	'...like the issue of enemas, we will continue making our own observation. One must make, er, the observation throughout and see amongst, of all the patients who delivered how many did I give enema, how many did I not and for whatever reason and make an observation of that.' (FGD hospital B)

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
Hospital B (Cont)		'Now that we have read it over and over again we are certain to take it serious. You see, you know sometimes when things start, you are like until it dawns in your mind that you really are supposed to change. So, we need to hear it over and over again...Yes its like an advert, before you can really get into buying whatever it is advertising, you need to see it time and time again, until its in your mind.' (Midwife, hospital B)		
Hospital C	'OK, my first reaction was that if it turns out to be something good then we will go along with them, but if it turns out to be something we don't agree with we definitely won't go along with them. '(Midwife, hospital C)	'At the beginning we always thought that the traditional way was the best way. But then the Better Births Initiative, it's more sense, and you find that by the way, you were doing a bit more of harm to the mother...it was good, you feel that by the way, you can do more good for the mother.' (FDG hospital C) 'and you know, the things we did in olden days when we were training, it was made out that you must do this. There was nothing proven that it works or it doesn't work. So I think maybe to practice evidence based medicine we need to update ourselves.' (FGD hospital C) 'It was quite useful, it takes us back to reflect on what we were doing before, and you find no, there are better ways.' (FGD hospital C) 'You see, just the thinking of "let me do it another way" it's a very big change you see...to think that you don't have to do it as before all the time.' (FGD hospital C)	'Just to discuss what was done, and get views from other people, it's [the workshop] making life more easier, and you appreciate your job. You know exactly what you are expected to do...and it sort of removed the rigidness, that this is routine, so I must do it definitely. You see, somebody will come and say "why didn't you cut an episiotomy, she was a primigravida?", but you can give facts, that I didn't cut because of one, two three, four [reasons].' (FGD hospital C)	'When you hear it at the workshop, maybe you think that no, will it really work? But when you are next to the patient you see, you really feel the difference. The other day the patient wanted it [an enema], but then you see that without an enema there is not much difference.' (FGD hospital C) '...and like, from my own experience it used to be a routine for every primigravida to be cut, so now I've seen that its possible for a primigravida to deliver without an episiotomy.' (FGD hospital C)

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
Hospital C (cont)		'...they should not think that it is really a radical change, it is something that you talk about it and just try doing it as you do your daily work. And you realise that there is something...and I am sure we are going slowly there to discover the good of this.' (FGD hospital C) '...we've tried very hard to utilise the Better Births Initiative in our department, and so far, I don't expect it to work immediately, it will take a while because some of the staff get out of the labour ward and we get new staff and we start again. But I think by the end of this year we will have achieved your goal.' (FGD hospital C)		
Hospital I	'I didn't know anything about this. It was the first time I had heard anything about the Better Births Initiative. So I was impressed, I wanted to hear everything, what it's all about.' (Midwife, hospital I)			
Hospital E			'We were implementing not to cut episiotomies, but it [the workshop] still helped us because now we emphasise that er, we are not going to bother ourselves cutting unnecessarily.'(FGD hospital E) 'We just put it up after delivery if the patient needs it [IV line]. Before it was all primaps, but now we don't bother ourselves, we just encourage them to eat and drink.' (FGD hospital E)	

Hospital ID	Initial reactions	Internalising	Deciding to change	Attempting change
			'...you learn to accept things the way they are, and we learn to take the patient the way she is. The example of enemas...if we hadn't given an enema we became so worried...but now we have information from this workshop, we see that even if we don't give an enema the labour can still progress.' (FGD hospital E)	

MATRIX 2. Social processes of change				
	Diffusion of ideas		**Social structure**	
Hospital ID	*Communication*	*Social interaction*	*Role models/social influence*	*Working relations/teamwork*
High change				
Hospital A				
Hospital F	'..we don't do it routinely [episiotomy], but some of the older midwives still, you know, if it's a primap they will. Or some of the people that haven't been long in maternity who are unsure, they also will. But we are busy educating each other, or myself talking to them, negotiating with them.' (FGD hospital F)		'We have contact with Dr...an obstetrician/gynaecologist, he's coming round, initially once a week but I haven't seen him for a while. He's coming, and if there is something we can ask him. We've got a senior colleague as well who's doing gynae, we can just ask.' (FGD hospital F)	
Hospital G	'We've got a new Sister now, and she is working with me, and she said "you must do an episiotomy because the head is not coming out". I said let the patient tear because I understand the tear heals mush faster than an episiotomy...the materials that you gave us were alright because now everyone can read them and they come back to me and say, "they said in the workshop you must do this".' (Midwife, hospital G) '...the sisters, you know, all of them can't attend at the same time otherwise there would be no-one on the ward, so they showed each other [the materials].' (FGD hospital G)			'...we must include the superintendent of the hospital. Because now, you see, when we are saying we are practising no enema, no shaving...they will ask and say, "you have not shaved the patient". But now if the superintendent was here, he is going to tell the doctors, "now lets try this and see what happens". (Midwife, hospital G)

	Diffusion of ideas		Social structure	
Hospital ID	*Communication*	*Social interaction*	*Role models/social influence*	*Working relations/teamwork*
Hospital H				
Hospital D	'...the first workshop we had, er, sisters and supervisors who attended, they had to give feedback on a daily basis until they covered all the staff.' (Midwife, hospital D)	'...really we felt it was of good to have people coming to tell us, and we realised the extra things we have been doing. Well, although change is difficult, but it didn't take us too much to compare what we are doing to the new ideas and agree. And again other people were there [who had not attended the workshop] and they were able to understand what was it about the workshop – we came together to share the information and came to a consensus.' (FGD hospital D) 'What I liked most was that you included doctors as well. Because you cannot work in isolation, it should be doctor-nurse interaction. Yes, I remember in the first workshop we had everybody, and we had good discussions.' (Midwife, hospital D)	'...if you're not sure about it, you ask the doctor...and then in the situation if there is a patient and you don't know...you can ask him" when it s like this, why so we do this?".' (FGD hospital D) 'You find that because most of the time you are there with doctors, there is a doctor who works with you – he wants his own practices, so we follow that doctor. Then when he goes, you stick on what he agreed with, until another one comes and he sees something being done and starts changing.' (Midwife, hospital D)	'...what we really did not reach...its concerning the shaving of patients; because it was creating a problem to others who were not in the workshop. It sort of respects why all of us need to be involved in the change. So er, we asked doctor ...to write us an internal policy so that the theatre people can be clear that since the workshop patients coming to theatre are not supposed to be shaved, and it helped.' (FGD hospital D) 'Some of us, we have established a committee for the childbirth companions, with goals...our mission is to promote Better Births in our principles.' (FGD hospital D)
Low change				
Hospital B	'I think somehow it has even opened up some communication, because we took most of the things for granted...and enemas especially. So after you came we, it kept us talking about something that was routine, we just did it. So somewhere, somebody wanted to know why it was introduced, why is it done? So its going to be ongoing...people were talking about it after that workshop.' (FGD hospital B)			

	Diffusion of ideas		Social structure	
Hospital ID	*Communication*	*Social interaction*	*Role models/social influence*	*Working relations/teamwork*
Hospital C	'...I think they've been very useful [the materials] because when you talk to people we can say "look, we are doing the Better Births Initiative and let's try this, experiment with this".' (FGD hospital C)		'I think when they came Dr Brown was also here. And, you know we had a lot of problems, unsure things that we discussed with her. And you know, er, putting her facts on evidence based medicine, she would tell us go and try this...and we really benefited a lot.' (FGD hospital C) 'I think Dr Brown spoke about giving an enema, we always thought speeds delivery, which actually when she told us about it we tried it as well, but it doesn't actually, there is no difference.' (Midwife, hospital C)	'I think first talking about it, if the departments meet, if they start to mention about it. You see when we don't talk about it, you still think it doesn't work. Just to give it a try, just to say OK let's try and see.' (FGD hospital C) '...that is very, very important. If all the departments can put that in practice and say "OK, look, in other places it has worked, let us first try and see", just not say no when you haven't tried...but its only by talking and thinking about these things that you come up with this [change].' (FGD hospital C)
Hospital I				
Hospital E			'We were wondering really what is it all about? But when Dr Brown came here to explain, we accepted the changes and then practised most of them.' (Midwife, hospital E) 'We don't give enemas these days, since Dr Brown came here, we don't give.' (FGD hospital E)	

MATRIX 3. Attributes of the change programme				
	Target practices		**Vehicle for communication**	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
High change				
Hospital A	'It would be this one of curtains, we don't have enough curtains. So in our labour ward it is the case that we have two beds in one room, so this one won't be having a husband and this one will, so it will infringe on the privacy of that one.' (Midwife, hospital A) 'It would be nice [to allow companionship], but we don't have the facilities. I think some patients from the private hospitals, they prefer to have the people with them, but here we have no such facilities. It has become a problem really, that for staff and patients there is no privacy.' (FGD hospital A) 'I think it's a very important point. The facilities, if you don't have the facilities how can you say we can do these things? Basically we can check, we can't so that, the privacy, we don't have enough space, so we can't do anything now as a routine. Until we have been provided with the facilities we cannot prepare, we cannot say anything.' (FGD hospital A) 'I remember the positions for women. Our beds are not adequate, they are the old style so we cannot do this in practice.' (FGD hospital A)		'For me it was a lot of relevant information…you really got new information that I think was helpful.' (Doctor, hospital A) 'Yes, you learn a lot, there is a lot of information, especially if you are working in labour ward.' (Midwife, hospital A)	'I liked them [the materials]. They were clear, easy to understand, bright attractive colours. In fact when you go into labour ward you are wondering what s this all about? I think its good…they attracted your attention.' (Medical officer, hospital A)

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Hospital F	'Well, companionship is obviously important for women, but I don't know how practical it is, especially in our setting.' (FGD hospital F) 'The single most important thing that I think has not changed yet is the position of delivery. And that will only change if we get these wedges. Because there is no way that anyone is going to delivery a baby on the floor, squatting or whatever...so semi-upright would be perfect. It's still comfortable for the doctor or sister doing delivery, and it's comfortable for the patient and safe. But we don't have the wedges...that's the main thing, that's the one main thing that's still a problem' (Doctor, hospital F)	'Some patients they prefer to always have somebody there, but some patients do not feel relaxed at all and the relationship between the staff and the patient changes. The patient now is, how can I put it?, is more seeking attention, unlike when we are only two and they would listen to me.' (FGD hospital F) '...the patient becomes disrupted, like she seeks more attention to the companion, she no more listens to what I'm saying.' (FGD hospital F)	'I think it was enjoyable, it taught us a lot. It showed us which things to change and which things we are on the right track with.' (Doctor, hospital F)	'It's bright and colourful, and it takes the real essence, especially the calendar thing [desktop reference]. It takes the real essence, you know, that's important.' (Midwife, hospital F)
Hospital G	'I think its important [companionship], but now its difficult for us because of the physical layout of the ward. There are four beds in a room...then just imagine having visitors for the four patients, and this one is now delivering, and the relatives are there. Just imagine this one pushing and screaming and then its not nice for the patient having other people there.' (FGD hospital G)	'No, I was actually negative to it [companionship], because you know, you don't feel comfortable, you don't do your work well if the place is full, you understand? So the relatives will come and tell you no, "this was not done", and "when are you going to do this?" They tell you what to do, so I chose not to accept it.' (FGD hospital G)	'...I find er, I really, I don't know what was the aim to it all, what actually I think, or thought, that it is now Dr Brown or whoever who is doing now research and to do a thesis on er, other ways of delivering babies or whatever. And OK, it could have been to emphasise the patients right...' (FGD hospital G)	'I like them [the materials]. There is that one you can put on the table...so everyone can see and for transferring information it was good.' (Midwife, hospital G)

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Hospital G (cont)	'...that was the other issue, that was discussed [women's position during delivery], but we haven't done that because don't have the capacity to let the patients sit in the upright position. They are still all now on their backs in supine and they deliver that way.' (FGD hospital G) '...squatting positions, well maybe if the woman feels comfortable. But we are not used to any position.' (FGD hospital G) 'We feel that the flat position is a good position for delivery. It's very much difficult to catch the baby when the woman is squatting on the floor.' (FGD hospital G)	'...are they utilising that more time? Because while you are shaving a patient or giving a patient an enema...you are talking to the patient and telling them, "I'm giving you this enema and this is what is going to happen to you" and whatever. While you are busy with the procedure you are busy with the patient. But now when people are having more time, what are they doing? They go top the nurses counter or to the tea room and are starting with the bulletins or administrative work and they don't talk to their patients. The procedure brings you to the patients.' (FGD hospital G) 'It means the midwives are not doing their work. Because if the relatives are there, then they don't progress the patients very well, they don't do the PV's, or every 30 minutes or every hour the blood pressure should be taken and all those things. And they don't do it because now the relatives are there. And they are querying "what are you doing?...and if you are chasing them out now to do a PV they say " why can't we stay"....and you know, they are not only interested I their own family member, but they are interested in all the other people!. (FGD hospital G)		
Hospital H				

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Hospital D				'They were user-friendly, bright. Like the calendar [desktop reference], this is one thing that you can read time and time again. You don't have to have a big book where you've got to read as if you're studying...so this one is just sketchy and user friendly and more attractive.' (Midwife, hospital D) 'I actually liked the one that's like a calendar, ya, because it's a reference, when you have a question you can just read one or two lines. Its very user friendly' (FGD hospital D) 'The design...its African renaissance! Yes, it is so they are interested in it, and it's easy to read and so attractive...it's bright colours, makes you interested.' (FGD hospital D)
Hospital J	'Yes, the only thing that is lacking is the position of the mothers giving birth...that time you suggested that squatting is an easier method, its still not used. Mainly because of the situation on the labour ward, maybe we don't have big enough beds to accommodate squatting.' (Midwife, hospital J)	'...we find that in fact this companion thinks that you as the midwives, you are not doing enough. I don't know whether she thinks you should be caring, sitting with her...I don't know, but you can actually see she's sulking with you.' (FGD hospital J)	'The workshop was very educational, I learnt a lot. I liked the idea of not shaving patients and ...if the patient gives birth normally that is a thing I would like to see done all the time.' (Midwife, hospital J) 'Hmm, yes, that's why I say if you can give it very often, because we need the latest information and researches.' (Midwife, hospital J)	

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Hospital J (cont)		'The companion should be the person who actually understands her role or his role...the companion should be enlightened as to what to expect, what are our expectations, what we expect form you, what is your role. We expect you to behave like this towards the patient, this is how you must help your patient. But now you find that the companion is actually panicky, more panicky than even the patient herself, when you expect her to be calm and be able to make the patient calm...I don't know how this is actually going to be done, but if this person could be trained, could be enlightened.' (FGD hospital J)	'I think the presentation was quite relevant, because you know, as we say these days we are practising evidence-based medicine, but you don't want to be doing something that you don't know whether it is based on evidence, or the book was written by somebody years ago. And you just continue because it is routinely done. Yes, the presentation was very good.' (Midwife, hospital J) 'Yes, there is, I felt there was really a need. You find there are so many changes going on over the years, and then you find that we are still here sticking to the old things that we are doing because its never been introduced.' (Midwife, hospital J) '...especially dealing with the situation of daily in and out that most of us are situated in. Like if you are in maternity you stay there...it's the same people all week. So I think workshops and this new information and researches will help us, and the patients will benefit as well.' (Midwife, hospital J)	

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Low change				
Hospital B	'Yes, the barriers, you know, it's the layout of the place. Our labour ward was built a long time ago, we didn't have this type of information…and now the geography does not, its not let's say, user friendly. I would like to bring the supportive system, but now because of the geography of the place those are the boundaries, that prevent us from doing what we want to do.' (Midwife, hospital B)	'…another thing, they are imposing that they know better, "its not done that way", some such things. She has to know what are the procedures that are mainly done by the professionals, that they will not have any input on that.' (FGD hospital B)	'To start with, there is nothing I didn't like about it. I liked it very much. And we are living in a dynamic world, we need this type of workshop because it is a scientific thing and is based on facts. So, er, if things are base don fact it is more or less you are on the right track, you are doing the right things…so this type of workshops are really crucial to the way we do things.' (Midwife, hospital B)	'The workbook, it's informative and simple and straightforward. Its simple language that's used…and the information came out clear and it's readable.' (Midwife, hospital B) '…its more of a black thing than a white according to these pictures. It makes me feel like it is for us, we can relate to it. '(FGD hospital B) 'Yes, we are now, somehow, we are now important as blacks. A renaissance! African Renaissance!' (FGD hospital B)
Hospital B (cont)	'We haven't started practising it [companionship] because of the space – the main issue is the space, and the privacy too.' (FGD hospital B) 'We don't have a problem with it [companionship], but I think the problem that we have is with the space, because our labour ward has only two beds. And we won't be able to have somebody supporting the patient because at times you find we deliver on the two beds at the same time.' (FGD hospital B)		'Yes, I liked the content of the workshop because these are minor things, these are things that we can always do away with, we can deliver a patient having not undergone all these things.' (Midwife, hospital B) 'The workshop for me, it was an eye opener, because I became aware of certain things I was not quite aware of. To me it was an eye opener, yes.' (Midwife, hospital B) 'I personally feel there is a need, as I just stated, we need more of these workshops because there are new informations that are moving with the times, so we are not left behind.' (Midwife, hospital B)	

	Target practices		Vehicle for communication	
Hospital ID	*Physical constraints*	*Disruption to work*	*Workshop*	*Materials*
Hospital C		'The only thing is that most of them are there but they don't know what is expected of them as partners you see. So sometimes if they come in and they don't know we try and tell them this is what we expect from you.' (FGD hospital C)	'Yes, definitely there was a need. And you know, I must say we have employed new sisters as well now, so we wouldn't mind if you would come again.' (Midwife, hospital C)	
Hospital I			'Yes, I liked it. Let me say, it was a learning situation because we didn't know about some of the things. Yes, we were not aware of some of the things.' (Midwife, hospital I) 'Yes, there is a need. We should know what is happening outside, we should not be left behind with old methods.' (Midwife, hospital I)	'Yes, everything was clear, everything was well explained in this [workbook]...even the posters, because everything was there, the drawings, whatever you explained.' (Midwife, hospital I)
Hospital E	'Only a few women want the squatting position, and its like women who have never delivered in a hospital, those ones do like to squat...we just deliver them, but its not easy. The babies come out in a funny position.' (FGD hospital E)		'I liked the workshop, its like, its empowering. So I wish we could have something like this always.' (Midwife, hospital E) 'Most of the white people are not undergoing antenatal here, that's our problem here....they only come for delivery and then immediately after they want to get out. Once the baby is out they just want to go home. They might think that black people are the only ones to get benefit from this [programme].' (FGD, hospital E)	

MATRIX 3a. Attributes of the change programme				
Hospital ID	**Mode of delivery**		**Context of delivery**	
	Atmosphere	*Presentation*	*Staffing issues*	*Resistance*
High change				
Hospital A		'It was very clear, I remember it was audio-visual and it used overheads.' (Midwife, hospital A)	'The facilities are important, like, if the department is not well staffed. We cannot implement the squatting because we are short staffed, we cannot do it.' (FGD hospital A) 'We do not have enough staff, they [women] do not have any option [regarding delivery position], we cannot do anything else. So, until we can address the staffing problem as well, I we have enough people the OK, we can attend the emergencies and other essentials and then offer options to women. But if we look at the staffing facilities, we are not left with any other option.' (FGD hospital A) 'You know, I think it us a good idea when we are well staffed. Now it seems that one of the reasons we did not do particularly well is that we have so much to do, we just couldn't follow it up.' (Doctor, hospital A)	'I think also if you want something to change you must change the protocol for everybody to follow. If you don't do that then there are people who will not change.' (FGD hospital A) 'Like a new thing, you can never get permission for protocols immediately, so the difficulty is that some people you say, "please maybe not do this", they may not agree, they may be used to the old method of doing things, that is the only problem.' (Doctor, hospital A) '...the only thing is that are we acting on the workshop? If I am honest with you there are things we should be ding, I don't know if we are really acting on all the parameters...but it is difficult for me to determine. I have been asking the staff, but they are not very much interested in clinical research, its difficult, I don't know if they can really change their minds or not.' (FGD, hospital A) 'I don't think there's a problem with liking it, definitely everybody appreciated the workshop. But, because I asked them, I found that they are not interested any more.' (FGD, hospital A)

Hospital ID	Mode of delivery		Context of delivery	
	Atmosphere	*Presentation*	*Staffing issues*	*Resistance*
Hospital D	'As we have just discussed, really we felt it was of good to have people coming to tell us and we realised the extra things we have been doing. Well, although change is difficult, but it didn't take us too much to compare what we are doing to the new ideas and agree. And again other people were there able to understand what was it about the workshop, we came together to share the information and came to a consensus.' (FGD hospital d)		'I think, like, we are in a hospital and people do rotate, and sometimes we are having newly qualified people who will be allocated in the ward, and we can't take it for granted that people down there will know what to do. We need to continue with the workshopping and in-service, and giving to new personnel who are coming so they also know what to do. Because, like, for instance, as we allocate people to different wards, others are still sticking to the old, er methods we use – for coming back they need to be re-oriented that we have changed the practice in this way.' (Midwife, hospital d)	'One thing I will say is it is difficult for people to accept the change...the personnel, to deal with the introduction of the Initiative, it's very difficult. Like the having of the patient, some people don't understand that we have changed and now moved to taking the patient to theatre without shaving..' (FGD hospital D) 'At times it creates a problem. One of the things that this change created is people become stereotyped. Now they focus on the change that you have introduced...then there is a group who is not implementing. It is also hard for those personnel who do not ever change...and it's going to challenge the whole system. So there is conflict between those who don't want to change and those who have changed...the resistance to change' (FGD hospital D)

Hospital ID	Mode of delivery		Context of delivery	
	Atmosphere	*Presentation*	*Staffing issues*	*Resistance*
Hospital J		'Ok, I think it was well presented. I understood almost everything you said, and we tried to implement everything. And it was more beneficial to us than any other thing. And we hope we can do most of those things you know, because most of us don't attend workshops, so we are not acquainted with the latest information and researches.' (Midwife, hospital J)	'The thing is, those people who attended the workshop, they are not in one department...so it's not possible that they implement these things...I think they can be altered by this regular thing, the workshop, because it will be eventually that everyone has attended, so everyone will have the knowledge. We mustn't concentrate only on this ward, because they change them with antenatal ward, so that can be arranged by sisters – even if you are not working on ward two [labour ward] you can go to that lecture [workshop], so that when you are allocated there you will know.' (FGD hospital J)	'...I was going to say, the problem could be, you know, some people are difficult to change. You must be honest and say it out. When somebody has personally not attended whatever [workshop], then you come as her colleagues, at her level to try to say to her, this is how it should be done. You may...experience some resistance.' (FGD hospital J) 'I wouldn't say that, I'm not sure there are things that prevent people from changing. Maybe its just to be resistant, that's all.' (Midwife, hospital J)
Low change				
Hospital B	'Everyone contributed to it, it was enlightening and everybody just said what they wanted to say. It was a relaxed atmosphere...we were quite honest about everything including the things we were unable to do. We were free to say that we did not do it because you were not very authoritative.' (Midwife, hospital B) 'It's not like you have a stick and are saying "why haven't you done this?"...it is more of an understanding of how things change, not telling us. It's a modified way of saying, it's a nice way of saying "change" and "you can do without these things". And that is why we			

	have even decided now that we are going to take some steps with some things, with the enemas.' (Midwife, hospital B) 'Because you really can say what is in your mind about the whole thing...everybody is just giving opinions, you are free to do that. No-one is going to harm or laugh at your spoken language, you see, so it's a good atmosphere.' (Midwife, hospital B)			
Hospital C				
Hospital I				
Hospital E				

MATRIX 4. Evaluating the self-audit mechanism				
Hospital ID	**Effectiveness**		**Barriers to use**	
	Motivating influence	*Aid to communication*	*Staffing issues*	*Lack of motivation /support*
High change				
Hospital A			'You know, I think it's a good idea when we are well staffed. Now it seems that one of the reasons we did not do particularly well is that we have so much to do, we just couldn't follow it up. There are so many patients, so few staff.' (Midwife, hospital A) 'It's just like, you do other things, there is so much to do. Research is actually a good thing if there is a lot of people doing it, then the other people concentrate on it, to follow it up. But here we have so much work to do. It is a good thing, but I don't know whether in our facilities we can really give you a clear picture. Or maybe it will highlight some of the problems, why it was not successful.' (Doctor, hospital A)	'No, no, more contact, maybe it would have helped us to follow it up more closely' (Doctor, hospital A) 'it was done in the beginning, but not for long. We didn't really know how to use it. Maybe if you had followed up sooner, there was lack of motivation.' (FGD, hospital A) '...the basic thing is we didn't see the people who are doing the research. So, the people thought that maybe they weren't interested anymore...that was the main factor. If I was the research I would be regularly visiting day by day, but there is lack of interest from the researchers. The people here have other things to do, so you can forget it, I think that's the main thing.' (FGD, hospital A)
Hospital F				
Hospital G				
Hospital H				

Hospital ID	Effectiveness		Barriers to use	
	Motivating influence	*Aid to communication*	*Staffing issues*	*Lack of motivation /support*
Hospital D	'We had that chart, whereby when we were starting they were recording how many patients were having enemas per day, how many do episiotomy...and as time goes on we realised that it was just as good not doing it.' (FGD, hospital D) 'OK, at first you know, when you bring change to people they don't just take it. They thought it was extra work of sitting down and charting, recording all that, but as they practised it they realised it was of good help.' (FGD, hospital D)	'Ja, it was very useful and it gave other people chance to practice...really it was giving everybody a chance to be involved. And those who were wondering what is the chart, we explain that OK, we attended a workshop and its how we are going to practice, instead of taking it and shoving on the shelves, it will reach many people.' (Midwife, hospital D)		
Hospital J				
Low change				
Hospital B			'Er, I think we normally say we are busy. And sometimes we are. And really we don't know how to attend other things except that which we are doing. You know, it was something extra on top of what we do on the ward, so that is why I think we never started it.' (Midwife, hospital B) 'Ja, I thought it was something additional, extra work to do. And also its from outside, you know [laughing, embarrassed].' (Midwife, hospital B)	'No, unfortunately we didn't use them. Its unfortunate...erm, I think from the outset what we should have done is immediately put the chart on the wall.' (Midwife, hospital B) 'Er, no particular reason, but as I say, immediate motivation. Or maybe sometimes they [the staff] work better if there is someone in charge...and someone can tell the night nurses about the charts.' (Midwife, hospital B) 'I would say maybe from the outset if we had immediately put the chart there. We needed someone prodding us and saying "do that".' (Midwife, hospital B)

Hospital ID	Effectiveness		Barriers to use	
	Motivating influence	*Aid to communication*	*Staffing issues*	*Lack of motivation /support*
Hospital B (Cont)				'Yes, or the alternative, what could have happened was, maybe sometimes if you could come and visit us and say "Hi people, are you still doing the chart?" and say please continue and maybe one or two phone calls to see' (Midwife, hospital B) 'But the other thing is, you know in December we are all mad about the holidays. Yes, it was bad timing...this had a heavy influence on it.' (Midwife, hospital B)
Hospital C	'OK, that wasn;t difficult because right at the beginning we sat down and we studied how do we do that. And in the long run it came out, it was very clear, I think because we came together and said lets give each other ideas, how do we want this thing done. Eventually we got it right, and it was not problematic, it was very clear.' (Midwife, hospital C) 'It was useful, like I said to you, you could see that in the beginning people were stagnant, you know, as to what they've learnt, but as time goes on people change their ideas, as you speak to all of them.' (Midwife, hospital C)	You know, for instance the posters she gave us, we must plot the number of patients we gave enemas, and the patients we did not give enemas. At the beginning everyone was giving enemas...and then as time went on the graph moved down, so less people were giving enemas, so they were quite useful.' (midwife, hospital C) 'I must say that usually we used to do it as a routine thing, that you give enemas. But it has changed; you find that amongst 10 patients that you admit, only two got enemas, eight didn't get, so it has changed.' (FGD hospital C)		

Hospital ID	Effectiveness		Barriers to use	
	Motivating influence	*Aid to communication*	*Staffing issues*	*Lack of motivation /support*
Hospital C (cont)	'Maybe in our monthly statistics we can include the Better births with this, and see what we have done it will help.' (FGD, hospital C) '...of course with this [audit] we can see how we are progressing , but can't you find another way, with the figures, some way of feeding back, giving you some figures, the statistics? Although these are already showing what we are doing, but maybe, so that we can compare, if we have some forms or some type of returns?' (FGD, hospital C)			
Hospital I				
Hospital E	'It's helping, because you know, we really want to do what is on the chart. We want to follow the chart and we will succeed.' (Midwife, Hospital E) 'Yes, I think it was a useful thing, because since the workshop it has motivated us to do some of the things. Its right to have the chart.' (FGD, hospital E) 'The chart I think is useful because it motivate you – let's now do this delivery without episiotomy – it definitely helps you not to do it.' (FGD, hospital E)		'And again we are so short staffed, some people want to plot on those charts, and sometimes after delivery its already after hours so maybe you go off...and you forgot to plot...You know yesterday I had so many deliveries, what happened at those deliveries? I didn't plot them, you know sometimes its not possible.' (FGD, hospital E)	

Annex 6

A6.1 Data collection instruments

Exit interview schedule (postnatal women, baseline and follow-up)

Hospital:	{HOSP}
Participant number:	{PPT}
Date:	{DATE}
Interviewer name:	

VERBAL CONSENT

My name is ....., I am working for the RHRU, Chris Hani Baragwanath Hospital in Johannesburg. We are conducting a small study to try to improve the quality of care for women in labour. The study is exploring ways to make care more humane and evidence-based. As part of the study, we would like to ask you a few questions about your views of childbirth care and experience of procedures that are used during labour and delivery.

The interview will not take more than 10 minutes. As a user of this maternity unit, your views are very valuable and we appreciate the time you take to participate in the interview.

Your name will not be recorded anywhere on the interview schedule and all your answers will be kept strictly confidential. You do not have to answer any questions you do not wish to, and you may withdraw from the interview at any time. If you do so, the care you receive now and in the future will not be affected in any way.

Would you like to take part in the interview? Yes ☐ No ☐

Instructions to the interviewer:

- Ask if she has any questions. Respond to questions as appropriate, then continue.
- Please circle the relevant answer for each question. When there are several options, read the question and options to the woman, and ask her to choose the one that best fits her experience.
- Other instructions will appear in bold type in the text.

To begin, I would like to ask you some questions about yourself.

Please circle the relevant answer.

1. How old are you?

1 = under 16

2 = 16-18

3 = 19-25

4 = 26-35

5 = over 36

2. Is this your first delivery?

1 = Yes **(go to Qu. 4)**

2 = No **(go to Qu. 3)**

3. How many times have you given birth?

1 = 1-2

2 = 3-4

3 = More than 4

8 = Don't remember

4. Did you attend antenatal care during your pregnancy?

1 = Yes

2 = No

8 = Don't know

5. What kind of delivery did you have?

1 = Normal vaginal

2 = Assisted vaginal

3 = Elective CS

4 = Emergency CS

8 = Don't know

Now I would like to ask you a few questions about labour and delivery.

6. Were you given an enema?

1 = Yes

2 = No

8 = Don't know

7. After the labour pains started, did you:

1 = Stay in bed most of the time

2 = Move *around*

8 = Don't know

8. Were you shaved before delivery?

1 = Yes

2 = No

8 = Don't know

9. Was a drip, with a bag, inserted into your arm during labour?

1 = Yes

2 = No

8 = Don't know

10. Was it easy to get a drink during labour?

1 = Yes

2 = No

8 = Don't know

11. Were you thirsty during labour?

1 = Yes, very

2 = Yes, a bit

3 = No

8 = Don't know

12. What position were you in for delivery?

1 = Lying on your back
2 = Sitting upright
3 = Squatting or standing
4 = Other
5 = CS delivery
8 = Don't know

13. Did you have an episiotomy (were you cut underneath) when you delivered your baby?

1 = Yes
2 = No
8 = Don't know

14. Did you tear your perineum (underneath) during delivery?

1 = yes
2 = No
8 = Don't know

15. How long, after delivery, was it before you were given your baby to hold and stay with you?

1 = Immediately
2 = Between ½ and 1 hour
3 = Between 1 and 2 hours
4 = Over 2 hours
8 = Don't know

Now I would like to ask you a few questions about how staff treated you during labour and delivery.

16. Did staff explain the examinations and procedures before they were performed?

1 = Yes, most of the time
2 = Yes, some of the time
3 = No, not really
8 = Don't know

17. Did you feel frightened about childbirth?

1 = Yes, very frightened
2 = Yes, quite frightened
3 = No, not really
8 = Don't know

18. Did you have a companion with you when you were in labour?

1 = Yes **(see Qu. 18a)**
2 = No
8 = Don't know

18a. **If yes,** specify whom:

1 = midwife
2 = doctor
3 = midwife and doctor
4 = relative/friend
5 = other
8 = don't know

19. Were you allowed a friend or family member with you during labour?

1 = Yes
2 = No
8 = Don't know

20. Did you want a friend or family member with you during labour?

1 = Yes

2 = No

8 = Don't know

21. Did you feel alone during labour?

1 = Yes

2 = No

8 = Don't know

22. Did any staff shout at you during labour?

1 = Yes

2 = No

8 = Don't know

23. Did any staff slap or pinch you during labour?

1 = Yes

2 = No

8 = Don't know

24. Were any labour ward staff rude to you?

1 = Yes **(go to Qu. 24a)**

2 = No

8 = Don't know

24a. **If yes,** specify whom:

1 = midwife

2 = doctor

3 = domestic/cleaner

4 = other

8 = don't know

25. Did you have any questions you wanted to ask?

1 = Yes **(Go to Q.26)**

2 = No **(Go to Q. 27)**

8 = Don't know **(Go to Q. 26)**

26. Did the staff let you ask questions?

1 = Yes

2 = No

8 = Don't know

27. What were the best things you can recall about the care you received during labour?

Please record comments here:

.....

.....

.....

.....

.....

.....

28. What were the worst things you recall about the care you received during labour?

Please record comments here:

.....

.....

.....

.....

.....

.....

29. In general, was the care you received from maternity ward staff:

1 = Very good

2 = Good

3 = Average

4 = Bad

5 = Very bad

8 = Don't know

Validation notes: Before we finish, I would just like to run through some of the main points of the interview again. This is to make sure I have recorded your answers correctly. Please tell me if the following are correct.

Go through the schedule and fill in the answers in column 1 below. Ask the respondent if they are correct. Tick column 2 if the answer is correct, and change the answer accordingly if there is an error.

Variable	1. Recorded answer	2. Respondent validation
Delivery type:		
Enema:		
Shaving:		
Episiotomy:		
Tear:		
Companion:		
Oral fluids:		

THANK YOU FOR TAKING TIME TO PARTICIPATE IN THIS INTERVIEW

In-depth interview guide (providers at intervention sites, follow-up)

Hospital:	{HOSP}
Participant number:	{PPT}
Date:	{DATE}
Interviewer name:	

VERBAL CONSENT

My name is ....., I am working for the RHRU, Chris Hani Baragwanath Hospital in Johannesburg. As you know, we have been conducting a study looking at ways of making practice more humane and women-centred. As part of the study, you may have taken part in a workshop and a self-audit mechanism. We are now evaluating the package, and would like to ask you a few questions about the usefulness of the workshop and other materials, and any problems you experienced during the study period.

The interview will not take more than 30 minutes. Your views are very valuable and we appreciate the time you take to participate in the interview.

Your name will not be recorded anywhere on the interview schedule and all your answers will be kept strictly confidential. So that I can remember everything you say, I would like to record the interview – do you agree to this? Yes ☐ No ☐

You do not have to answer any questions you do not wish to, and you may withdraw from the interview at any time.

Would you like to take part in the interview? Yes ☐ No ☐

To begin with, a few questions about yourself:

1. Male Female

2. What is your position/job description at this hospital?

1 = Medical officer / intern
2 = Specialist
3 = Matron
4 = Midwife
5 = Superintendent

3. What qualifications do you hold?

1 = MD / MBBCh / MBChB
2 = Advanced midwifery training
3 = PEP training
4 = Fellowship / postgrad. qualification

4. How old are you?

1 = 25 or under
2 = 26 – 30
3 = 31 – 35
4 = 36 – 40
5 = 41 – 50
6 = 51 – 60
7 = 60 +

5. How many years have you worked in this maternity unit?

1 = Less than 1 year
2 = 1 – 2 years
3 = 3 – 5
4 = 6 – 7
5 = 7 +

A	Delivery, format, and content of workshops

First I would like to ask you a few general questions about the workshop we conducted here in Oct/Nov.

1. What did you think of the Better Births Initiative workshop?

   (what did you like, not like about it?)

   (length, timing, presentation method, content)

2. What do you think about the materials used in the workshop and other resources?

   (what did you like/not like about them?)

   (workbook, video, posters, ref book)

B	BBI concepts

Now I would like to ask you about your impressions of the BBI concept.

1. When new ideas are introduced into the labour ward, staff often react differently – what did you think, what was your first reaction when you heard about the Better Births Initiative?

   (positive, ambivalent, negative?)

a) Why did you have this reaction?

2. After the content of the workshop was described, did you feel you had a clear understanding of the objectives?

   (what was clear/unclear?)

3. Did you feel there was a need for the workshop for staff in this labour ward?

   (why/why not?)

4. Did you use the materials – posters, workbooks, reference booklet?

   (which did you find useful, why?, how?)

5. In your opinion, has practice on the labour ward changed since the workshop?

   (in what way, how, why?)

6. Have you experienced any problems, or barriers, that prevented you using the BBI information in your everyday practice?

   (what were the barriers, why?)

7. Would you encourage your colleagues to attend a Better Births workshop?

   (Why, why not?)

C	Implementation of self-audit

The following questions refer to the self-audit mechanism that was introduced at the workshop.

8. What did you think about the self-audit mechanism?

   (what did you like, not like about it?)

   (was it useful, why, why not?)

9. Did you use the self-audit and wall charts on the labour ward?

   (who conducted it?, how often?)

10. Did you feel there was adequate support to help you implement the audit?

    (did you need more support, from whom)

11. Do you have any other comments to add about the self-audit?

12. Have you experienced any problems, or barriers, that prevented you using the checklist or charts?

    (*what problems, did this stop you conducting audit again?)*

In-depth interview guide (providers at control sites, follow-up)

Hospital:	{HOSP}
Participant number:	{PPT}
Date:	{DATE}
Interviewer name:	

VERBAL CONSENT

My name is ....., I am working for the RHRU, Chris Hani Baragwanath Hospital in Johannesburg. As you know, we have been conducting a study looking at ways of making practice more humane and women-centred. As part of the study, you may have taken part in a workshop and a self-audit mechanism. We are now evaluating the package, and would like to ask you a few questions about the usefulness of the workshop and other materials, and any problems you experienced during the study period.

The interview will not take more than 30 minutes. Your views are very valuable and we appreciate the time you take to participate in the interview.

Your name will not be recorded anywhere on the interview schedule and all your answers will be kept strictly confidential. So that I can remember everything you say, I would like to record the interview – do you agree to this? Yes ☐ No ☐

You do not have to answer any questions you do not wish to, and you may withdraw from the interview at any time.

Would you like to take part in the interview? Yes ☐ No ☐

To begin with, a few questions about yourself:

1. Male Female

2. What is your position/job description at this hospital?

   1 = Medical officer / intern

   2 = Specialist

   3 = Matron

   4 = Midwife

   5 = Superintendent

3. What qualifications do you hold?

   1 = MD / MBBCh / MBChB

   2 = Advanced midwifery training

   3 = PEP training

   4 = Fellowship / postgrad. qualification

4. How old are you?

   1 = 25 or under

   2 = 26 – 30

   3 = 31 – 35

   4 = 36 – 40

   5 = 41 – 50

   6 = 51 – 60

   7 = 60 +

5. How many years have you worked in this maternity unit?

   1 = Less than 1 year

   2 = 1 – 2 years

   3 = 3 – 5

   4 = 6 – 7

   5 = 7 +

A Delivery, format, and content of workshops

First I would like to ask you a few general questions about the workshop we conducted here in Oct/Nov.

1. What did you think of the Better Births Initiative workshop?

   (what did you like, not like about it?)

   (length, timing, presentation method, content)

2. What do you think about the materials used in the workshop and other resources?

   (what did you like/not like about them?)

   (workbook, video, posters, ref book)

B BBI concepts

Now I would like to ask you about your impressions of the BBI concept.

1. When new ideas are introduced into the labour ward, staff often react differently – what did you think, what was your first reaction when you heard about the Better Births Initiative?

   (positive, ambivalent, negative?)

   a) Why did you have this reaction?

2. After the content of the workshop was described, did you feel you had a clear understanding of the objectives?

   (what was clear/unclear?)

3. Did you feel there was a need for the workshop for staff in this labour ward?

   (why/why not?)

4. Did you use the materials – posters, workbooks, reference booklet?

   (which did you find useful, why?, how?)

5. In your opinion, has practice on the labour ward changed since the workshop?

(in what way, how, why?)

6. Have you experienced any problems, or barriers, that prevented you using the BBI information in your everyday practice?

(what were the barriers, why?)

7. Would you encourage your colleagues to attend a Better Births workshop?

(Why, why not?)

Focus group discussion topic guide (labour ward staff, follow-up)

Hospital:	{HOSP}
Participant number:	{PPT}
Date:	{DATE}
Interviewer name:	

VERBAL CONSENT

My name is ....., I am working for the RHRU, Chris Hani Baragwanath Hospital in Johannesburg. We are conducting a small study to try to improve the quality of care for women in labour. The study is exploring ways to make care more humane and women-centred. As part of the study, you may have previously taken part in a workshop. Today we would like to have a follow up discussion with you about procedures that are used during childbirth, and how we can improve the care we give to women.

The aim of the group discussion is to encourage you to talk to each other to find out general opinions and views not individual opinion on the topics. You do not have to participate if you do not want to.

So that I can remember everything that is said, tape recorders will be used to record the discussion – do you agree to this? We will not use names in the transcripts. To make it easier to transcribe the tapes, only one person at a time should speak.

Instructions to facilitators:

1. Introduce facilitator/ observer and purpose of the discussion; get group to introduce themselves.

2. Ice-breaker to warm up.

3. Facilitator (IW) - follow the guidelines as closely as possible, the aim is to ensure the same topics are covered in each group discussion.

4. The guide comprises a list of topics that are relevant to the study, but some degree of flexibility is expected to accommodate the flow of discussion *(prompts are in italics).*

5. Try to keep the discussion on the topic in hand, without imposing direction of the discussion.

6. Re-direct the discussion at your discretion if it strays from the topic.

7. Encourage responses from all participants – ensure confident participants do not dominate and include shy participants by asking their opinions.

8. Observer (HS) - compiles summary bullet points for each section during the discussion.

9. Post-discussion – de-brief, go through summary points; hand out feedback forms.

Participant list

	NAME	POSITION	YEARS WORKED AT THIS UNIT
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

A	Discuss issues surrounding latest medical evidence, access to it.

1. Where do you usually get new information about clinical procedures?

a. guidelines

b. journals

c. peers/colleagues

d. circulars

e. textbooks

f. *Internet/database*

2. What is the best source of new information?

a. Which do you trust?

b. Which is most reliable?

c. Which is the most up to date?

3. Is new information readily available to you?

a. Is it easy to find new information?

b. How often do you hear about new evidence for procedures?

B	Consider some procedures that may be used during labour, the latest evidence, and possibilities for change.

4. What is your opinion on giving enemas to women?

a. Should we give enemas?

b. Evidence says the use of enemas should be reduced - is it possible to reduce the use of enemas at this hospital?

c. Why? Facilitating factors

d. Why not? Constraints

5. What is your opinion on shaving women for childbirth?

a. Should we shave women?

b. Evidence suggests shaving has no benefit and should be stopped - is it possible to stop shaving at this hospital?

c. Why? Facilitating factors

d. Why not? Constraints

6. What is your opinion on companionship for women during labour?

a. Should we allow companions?

b. There are clear benefits for the mother and baby - is it possible to allow companionship in the labour ward?

c. Why? Facilitating factors

d. Why not? Constraints

7. What is your opinion on episiotomy?

a. Should we perform episiotomy?

b. Evidence suggests use of episiotomy should be restricted - is it possible to restrict the use of episiotomy?

c. Why? Facilitating factors

d. Why not? Constraints

C	Changing practice

We have talked about some procedures commonly used on the labour ward, and the possibility of changing practice; now we would like to discuss some general issues about change....

1. Do you think it is necessary to update knowledge and change practice?

a. Why / why not?

b. Do we need to know about changes to practice?

c. What are the benefits?

2. What did you think about the workshop we gave about changing practice?

a. What did you like about it?

b. What did you dislike?

3. Would you encourage your colleagues to attend a workshop?

a. If not, why not?

4. What did you think about the materials used in the workshop?

a. Workbook

b. Presentations

c. reference booklet

d. leaflet for women

e. posters

f. audit mechanism – INTERVENTION SITES ONLY

5. Have you used the materials after the workshop?

a. What did you find useful, and why?

b. What was not so useful, and why?

6. Have you made changes to your practice?

a. What changes?

b. How have you done this?

7. Have there been any barriers, or factors that have prevented you from changing practice on the labour ward?

a. As individual service providers, how do you feel about changing your practice?

b. In the labour ward environment as a whole, what prevents you from changing practice?

c. If we think about other staff members or colleagues, are they supportive of change?

8. What kind of things would help you to make changes?

9. Do you have any other thoughts or comments about the change programme?

Thank participants

De-brief by going through summary bullet points for each section.

Annex 7

A7.1 Validity of the study design

The validity of a study refers to the extent to which the results of the research (or inferences drawn) are correct or accurate[1]. Two types of validity are commonly recognised - internal and external validity. Internal validity is defined as the degree to which the estimate of intervention effect is free from bias. External validity refers to the generalisability of the research results; the extent to which they can be applied across different populations and settings [2 3]. Random allocation of five sites to the intervention group and careful conduct of the study should have eliminated potential sources of bias, but inherent weaknesses in the one-group pretest-posttest design remain.

Internal validity

History: This is a threat when an event (external to the research project) takes place between baseline (pre-test) and follow-up (post-test), which could affect the dependent variable. It is possible that health professionals taking part in this study could have been exposed to other continuing education meetings, in-service training or conferences that might consequently affect their behaviour or clinical practice (dependent variable). However, the principle investigator is unaware of any such events that focused specifically on evidence-based obstetric practices, during the study period.

Selection: This is a threat when the intervention and control groups do not contain similar entities. In this study, clusters (maternity units) were randomly assigned to the intervention group. However, using a small number of clusters (five in each group) could result in baseline imbalances between study groups by chance. One way to overcome this is to use restricted allocation (i.e. allocation of clusters within identified strata), or matched pairs of clusters with respect to baseline characteristics[4]. Matching was attempted, but it proved difficult to find matching variables and distinct pairs in the 10 study sites.

Maturation: Changes to the maternity units in each study group over time (maturation) is not considered a major threat to validity in this study, since it was conducted over a period of just 12 months. However, there is a possibility that the intervention effect could be underestimated due to the rotation of labour ward staff. Removal of staff who had participated in the educational workshop intervention from labour wards to other departments had the effect of altering the composition of the post-test group. It was difficult to control this threat to validity.

Instrumentation: This is not considered a potential threat because definitions of outcome measures did not change; the same data collection tool (exit interview) was used at pre-test and post-test to determine practice rates; and quality assurance checks were in place to ensure data collection was reliable (see section 4.6, chapter 4).

Although history, selection, maturation and instrumentation have been considered as factors contributing to competing explanations in the one-group pretest-posttest design, it remains that this design was used in a complex social setting, where participants' willingness, ability and attempts to change their practice could have been the result of influences that had nothing to do with the study or the interventions used in it. A strength of this study is its use of quantitative and qualitative methods within the study design. Important trends identified in pre- and post-test quantitative data were explored further, and complemented by qualitative findings about change processes.

External validity

Generalisability is largely determined by the selection of clusters for inclusion in the study. In this study clusters (maternity units) were purposefully selected from one province (Gauteng) in South Africa, and the sample size is small. The study sites cannot therefore be considered representative of maternity units in other provinces in South Africa; but the results could reasonably be regarded as indicative of what might happen in other maternity units in Gauteng.

Construct validity

This refers to the extent to which a study can provide an understanding of how an intervention worked[5 6]. It is similar to external validity, but involves generalising from the study findings to the concepts of the study. This study represents an attempt to determine whether the observed change in health professional behaviour was a result of the operation of critical factors and attributes of the change programme that (theoretically) influence change, or the result of other factors, external to the study. It can be considered an explanatory study that aimed for high construct validity. It effectively explored what happened when the change programme was introduced, and how behaviour change occurred at the study sites.

To claim construct validity in a study is to suggest full understanding of how interventions work in theory, and that one can provide evidence that the intervention operates the same way in reality. As the results of this research suggest, the effect of a change programme cannot necessarily be determined by cause and effect relationships between variables; and change is more likely to happen as a result of unpredictable social

interactions or individual decisions within a complex human environment dominated by non-linear relationships (see box 7.1, chapter 7). Section 8.4, chapter 8 provides further discussion of appropriate designs and methods for evaluating implementation research.

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