

## Prospective semistructured observational study to identify risk attributable to staff deployment, training, and updating opportunities for midwives

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### Abstract

**Objective** To identify potential risk or mishap in the system of intrapartum care, relating to the deployment of midwives.

**Design** Prospective semistructured observational study.

**Setting** Labour wards of seven maternity units in the north west of England.

**Participants** All midwives working on the labour ward during the observation period in 2000.

**Main outcome measure** "Latent failures" within the system relating to midwifery staffing levels, deployment, and training or updating opportunities.

**Results** Despite the exemplary dedication of midwives, potential risk of mishap due to their deployment occurred within the system of care. A shortfall of midwives existed in all seven maternity units and was most acute in the largest units. Six units relied on bank midwives to maintain minimum staffing levels. High risk practices (oxytocin administration and epidural blockades) continued during midwifery shortfalls in all units. Some adverse events and "near misses" were attributable to midwifery shortages in all units, and near misses remained unreported in all units. Uptake of opportunities for training or updating in interpretation of cardiocographs and obstetric emergency management remained low owing to midwifery shortages in all units. A poor skill mix of midwives occurred at times in all units. In six units midwives spent time away from clinical areas performing clerical duties. In three units team midwifery systems were reported to erode labour ward skills and confidence.

**Conclusion** Midwives are fundamental components in the system of intrapartum care, and the system cannot operate safely and effectively when the number of midwives is inadequate, midwives are poorly deployed, and they are unable to engage in opportunities for training and updating.

### Introduction

Factors associated with adverse outcomes in maternity care have been previously identified by retrospective analyses.<sup>1-4</sup> These data were derived from records,

which may be incomplete and lack information on organisational factors. Inevitably, the approach that ensues is one that seeks to attach blame to individuals, which experts in critical incident investigation believe has limited corrective value.<sup>5</sup> Consequently, deeper analysis to identify the underlying causes may prove elusive.

This prospective study offers immediate recognition of hazards within the system, with opportunity for timely intervention. We present findings from observations made in a systematic manner, combined with information obtained from interviews with staff and examination of documents. By adopting this approach, we hoped to identify latent failures in the system or "accidents waiting to happen."

### Methods

#### Participants

We did the study in the labour wards of seven maternity units in the north west of England, geographically distributed and selected to cover a range of facilities. These included large inner city units with high numbers of births and obstetric complications as well as smaller provincial units. All had level 1 compliance for the requirements of the clinical negligence scheme for trusts.<sup>6</sup> Three units used team midwifery systems, whereby midwives worked on the labour ward on infrequent occasions, as opposed to other units where they were allocated to the labour ward for approximately three to six months. We interviewed all midwives working on the labour ward during the visit (204 team and core midwives), after informing them that the purpose of the study was to examine the organisation of care and identify risk within the system and not to question individual practice. This formed a random sample of a constantly fluctuating labour ward workforce. We obtained permission from the midwifery and medical managers of each unit.

#### Assessment tool

We minimised researcher bias by using a semistructured tool, created from the findings of the Confidential Enquiry into Stillbirths and Deaths in Infancy, maternal mortality reports, analyses of closed obstetric claims, and guidelines from the Royal College

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bmj.com 2003;327:584

of Obstetricians and Gynaecologists and the Royal College of Midwives, together with the clinical negligence scheme for trusts standards.<sup>1-4 6 7</sup> The tool covered 120 points and consisted of three parts: directing essential observations, guidance for interviews, and guidance for collecting documentation on work practices. The content covered adverse events, “near misses,” midwifery staffing levels, use of bank midwives, staff changeovers, allocation of patients, use of high risk practices, team midwifery systems, use of unit protocols, supervision of staff, and uptake by staff of opportunities for training or updating.

*Observation of the organisation of care*—We used the tool to observe systematically each labour ward’s organisation of care, adopting a “fly on the wall” approach. This observation covered the 24 hour period and took place over seven days (a total of 48-52 hours’ observation). Visits to the labour ward lasted between two and eight hours, according to the current clinical activity, and took place in offices, delivery rooms, and operating theatres, around the provision and use of resuscitation apparatus, pH measuring apparatus, fetal monitors, and data recording computers. A follow up visit over one day took place in the next year on completion of the study; it revealed little change.

*Informal interviews*—We informally interviewed all midwives on duty on the labour ward at opportune moments; we used open and closed questions. Some questions were specific to each midwife (33 questions)—for example, questions about uptake of opportunities for training or updating—whereas other questions required a general consensus of opinion (for example, “At shift changeover, how are midwives allocated to clients?”)

*Documentation of work practices*—Documentation used to corroborate findings from observations and interviews included adverse event criteria and reports, any near miss reports, midwifery staffing rosters, work boards, birth records, admission and discharge records, theatre lists, induction of labour lists, documentation identifying provision and uptake of training or updating opportunities, and unit protocols.

We made our findings through a triangulation of the above three sources to ensure validity. We found no obvious discrepancies between the different means of collecting information, and the semistructured tool yielded comparable information across the seven units when we repeated the process.

### Definitions

*Adverse event*—This has been defined as “an event, which has given or may give rise to actual or possible personal injury.”<sup>8</sup>

*Near misses*—These have been defined as “an event that under slightly different circumstances, could have been an accident.”<sup>9</sup>

### Results

Themes related to staff deployment and training emerged, highlighting latent failures or “accidents waiting to happen.”<sup>5</sup> Some adverse events and near misses occurred through midwifery staffing shortages. Although schemes for analysing adverse events operated in most units, reporting varied across the

#### Box 1: Adverse event 1 (reported by staff)

A decision was made to perform an emergency caesarean section on a woman at term, with a low lying placenta, an unreactive cardiotocograph trace, and fetal bradycardia. The procedure had to be delayed for two hours, as the five midwives on duty on the labour ward were too busy caring for other women in labour to assist in the maternity theatre. Staffing levels elsewhere on the unit precluded assistance. The infant survived in a poor condition.

units, as did the inclusion criteria. Adverse events and near misses share the same underlying causes,<sup>10</sup> and therefore provide learning opportunities, but no reporting schemes operated in any unit.

According to each unit’s midwifery staffing allowances, a shortfall occurred in all units; this was most acute in the largest units with the most complicated or high risk cases. Most units relied on bank staff to maintain their minimum staffing levels. High risk practices (administration of oxytocin and epidural blockades) continued during staffing shortfalls, and poor skill mix of midwives was common, with midwives spending time away from clinical areas performing clerical duties. Uptake of opportunities for training or updating in interpretation of cardiotocographs and management of obstetric emergencies was often prevented by staffing shortages, and midwives reported that team midwifery systems reduced their skills and confidence in the labour ward.

#### Adverse events and near misses

During the study, we directly observed one adverse event and 15 near misses. These were predominantly related to midwifery staffing shortages, and midwives from all units reported that such shortages were commonplace. To identify the frequency of such risks, we collected evidence from duty rosters and records of admissions, transfers, and births for the three calendar months preceding the visit. The adverse events in boxes 1 and 2 are examples of those discovered in two units during the week preceding the visit.

The collection of near misses was cautious, involving only cases in which a shortage of at least three to four midwives occurred during critical periods, such as deliveries. In total we identified 153

#### Box 2: Adverse event 2 (reported by staff)

Five midwives were on night duty on the labour ward, with only two more midwives on the whole of the unit. Within the space of 50 minutes, five deliveries occurred. These included an emergency caesarean section (normally needs two midwives); the birth of preterm twins, one of which was a breech presentation (normally needs three midwives); and three normal deliveries (normally need two midwives for each birth). When one of the normal deliveries resulted in a shoulder dystocia, delay causing birth asphyxia resulted when nobody was available to answer the emergency bell to assist the newly qualified midwife, who was acting alone. Ultimately, assistance was obtained when the midwife sent the woman’s partner to get help from the room in which the twins were being delivered.

**Box 3: Near miss 1 (directly observed)**

A woman with a twin pregnancy needed an emergency caesarean section, after induction of labour that morning at 38 weeks' gestation. Three midwives would normally assist in theatre: one to "scrub-up" and assist the surgeon and one to assist each paediatrician. Although six midwives were on duty, three other women had entered the second stage of labour at this time. Each birth needed two midwives (one to conduct the delivery and one to provide care for the infant and transport it to the centrally sited resuscitation room and summon assistance if needed). No assistance was available from elsewhere, as only two other midwives were on duty in the whole maternity unit. Consequently, the caesarean section was delayed for an hour until the three other women had delivered.

near misses due to midwifery shortages during each three calendar month period, and of these we had directly observed 12 during visits. This suggested that one such near miss occurred on average every 2.5 to 5 days, most often in units with the highest number of deliveries and complications. Box 3 gives an example of a near miss observed during one night shift.

**Shortfall of midwives**

According to professional recommendations,<sup>7</sup> and each unit's own staffing specifications, all labour wards experienced midwifery staffing shortfalls and poor skill mix, resulting in reliance on bank midwives to maintain minimum staffing levels in six units. The shortfalls were exacerbated when midwives were inappropriately assigned away from clinical duties, duplicating information from case records on to computers. Shortfalls were observed and confirmed during interviews and on evidence from duty rosters, clinical workbooks, and computer printouts.

**Use of team midwifery systems**

Team midwifery systems operated in three units in response to *Changing Childbirth*,<sup>11</sup> in an attempt to provide 75% of women in labour with a known midwife. Each shift had two non-team based midwives who remained on the labour ward and supported the others, but most of the midwives with substantial labour ward experience were, as a consequence, displaced into community based teams and thus worked in the labour ward infrequently. Alternatively, midwives with little labour ward experience now worked there for occasional shifts, providing care for all women served by their team, including the complicated, high risk cases. We interviewed a total of 65 team midwives, and documentation from duty rosters and birth records supported their reports that most of them (for example, 21 out of 27 in one unit) worked only two to four shifts a month on the labour ward, which they felt was insufficient to maintain their skills and confidence.

**Latent failures relating to high risk practices**

Women having oxytocin infusions and epidural blockades need increased midwifery supervision,<sup>7 12</sup> so shortfalls increase the risk associated with these procedures. Despite widespread shortages at times, unit statistics identified annual rates of oxytocin induction or augmentation of between 25% and 59%, which was

highest in units with most deliveries, complications, and staffing deficiencies. Similarly, annual rates of epidural anaesthesia (11-33%) were highest in units with the greatest staffing shortages. Analysis of the previously identified three months' near misses revealed that an alarming percentage of them (78-95%) involved the use of oxytocin for induction or acceleration, epidural blockades, or both during labour.

**Uptake of opportunities for training or updating**

Observations, interviews, and documentation (birth records and schedules for training or updating) revealed that opportunities for training or updating in interpretation of cardiotocographs and emergency obstetric management were provided only during working hours. Therefore busy periods and staffing shortages prevented uptake of scheduled training sessions.

**Discussion**

Shortfalls in midwifery staffing levels seemed to be widespread across the units, and this is a common finding.<sup>13 14</sup> However, the shortfalls were most acute in three units with the largest numbers of deliveries per year, with large numbers of high dependency or complicated cases. These units also reported high annual rates of oxytocin use for induction or augmentation of labour (25-49%) and the provision of epidural blockades (17-33%). Although this might reflect a need generated by the high risk clientele, these practices also require greater supervision from midwives, resulting in increased risk when this is not forthcoming. This study has shown that midwifery shortfalls are the underlying cause of some adverse events and many more "near misses." None of the units we visited operated a near miss reporting system, and therefore the cases identified in this study simply remain silent—that is, warnings that went unheeded.

No contingency plans existed in any of the units to cope with the unexpected surges in demand for care that occur frequently on labour wards. During intensely busy periods, when shortfalls were most acute, senior midwives in charge of the shift were unable to provide support for inexperienced midwives. Latent failures therefore increased when combinations of inexperienced midwife and inexperienced medical staff were left unsupervised with complicated cases.

Despite previously identified risks relating to insufficient training or updating in interpretation of cardiotocographs and emergency obstetric management,<sup>1-3 6 7</sup> unless "time out" opportunities are provided for midwives, uptake of the opportunities during working hours will remain low owing to staffing shortages. The implementation of labour ward innovations (such as information technology) has also increased the midwifery workload, creating a burden for a workforce already overstretched. We therefore suggest that clerical aspects of the clinician's work could be delegated more appropriately elsewhere.

Although team midwifery systems seem to provide an answer to the challenges of *Changing Childbirth*,<sup>11</sup> relatively inexperienced midwives occasionally have to represent their team and work in an intensive care situation on the labour ward with high risk cases. When

### What is already known on this topic

Factors associated with adverse outcomes relate to recognised national shortages of midwives, inadequate fetal monitoring, and poor interpretation of cardiotocographs in birth asphyxia cases

Further problems are failure to respond to cardiotocographic abnormalities and delay in summoning medical assistance and involving senior staff

### What this study adds

All maternity units experience midwifery staffing shortages, and most units rely on bank midwives to maintain minimum staffing levels

Adverse events occur as a result of midwifery staffing shortages; “near misses” due to staffing shortages occur frequently and remain unreported

Poor skill mix of midwives exists at times, and midwifery shortages prevent uptake of opportunities for training or updating

such work is sporadic, the development and retention of necessary high dependency skills become very difficult, creating stress for the midwife and risk for the client. Skill mix within the labour ward also depends on cover provided from each team. However, as the teams operate independently in the planning of duty rosters, overall labour ward skill mix patterns become less predictable and constructive. Consideration should therefore be given to whether the risks generated by team midwifery systems outweigh the benefits of attempting to provide continuity of care.

### Conclusion

We observed many latent failures (“accidents waiting to happen”) in this study. Our findings show that inadequate midwifery staffing levels and ineffective deployment of midwives remain essential failings in

the system of care and are the foundation of many adverse events and “near misses.”

We thank the staff of the seven anonymous maternity units that took part in this study and the midwives, whose dedication and commitment to work was commendable.

Contributors: BA did the research, with clinical supervision by ME, academic supervision by NB, and further academic support from SH. BA and ME wrote the paper, with advice from NB and SH. BA is the guarantor.

Funding: The research received funding from the NHS Executive North West R&D, whose encouragement and advice has been appreciated. Additional funding was from the North West Lancashire Health Authority and the University of Salford. The guarantor accepts full responsibility for the conduct of the study, had access to the data, and controlled the decision to publish.

Competing interests: None declared.

Ethical approval: The North West multicentre research ethics committee approved the study, as did each of the seven trusts’ local research ethics committees.

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(Accepted 15 July 2003)