Evidence Brief

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# What is the relationship between midwifery staffing levels and outcomes?

Staffing levels have been implicated in cases of adverse maternity events, near misses and sub-optimal outcomes such as unwell new-borns or still births. Care that is missed due to high workload can affect the detection of deterioration in mothers and babies, and delay appropriate management. A national shortage of midwives has resulted in increased reliance on support workers but the possible effect of skill-mix changes on outcomes has not been assessed.

This Evidence Brief describes a systematic scoping review to explore evidence on the association between inpatient midwifery staffing levels, skill mix and outcomes for mothers and babies. Researchers at the University of Southampton aimed to understand the amount and strength of the available evidence, the direction of relationships established, and to highlight gaps for future research.

## Why is staffing in maternity care important?

Around three quarters of women in England give birth in obstetric units and most care is still provided by core? midwifery staff. This is despite a move to increase continuity of carer by organising midwives in teams to cover antenatal, intrapartum and postnatal care [1]. The rising caesarean section rate highlights the continued need for inpatient care and a stable core team of staff.

The Royal College of Midwives estimates that the NHS is short of almost 2,500 full-time-equivalent midwives in England. Understanding how staffing relates to outcomes helps to guide staffing decisions to ensure a service is safe. Given the pressures on resources, managers' decisions about the number and mix of staff, in any setting, needs to be based on evidence of what is needed to achieve optimal outcomes. This review focuses on midwifery staffing for inpatient settings.

In nursing, low staffing levels have been associated with lower satisfaction, poorer patient outcomes and increased staff stress. However there have been fewer studies of staffing and outcomes in maternity care [2]. An increasingly large proportion of obstetric cases are complex due to rising maternal age, obesity and comorbidities. The Ockenden report highlighted the importance of multidisciplinary working and risk management [3]. Appropriate staffing to manage risks should include consideration of skill mix to ensure that there is the 'right staff, with right skills, in the right place at the right time' [4].

## Method of this review

A systematic scoping review summarised available evidence on the relationship between midwifery staffing and care outcomes in inpatient ante-natal, labour/delivery and post-natal wards [5]. Outcomes included were those affecting mothers, babies, staff, costs or quality of care. Searches were completed in Medline, Embase, CINAHL, Cochrane Library, TRIP, Web of Science and Scopus databases. Reference lists of eligible studies were scanned to identify further references.

## The evidence

Twenty-one studies published between 1988-2020 were included, comprising 11 cohort, one case control, six cross-sectional studies and three randomised controlled trials [6-8]. Nine of the observational studies had over 30,000 participants.

Fourteen out of 21 studies reported only outcomes relating to labour and birth. There were no studies of staffing in antenatal care, and little research on postnatal care and outcomes. Staffing was typically measured at an organisation level rather than at the unit or mother level and so provided a crude measure of staffing exposure. A further limitation was the lack of adjustment for background risk factors in the populations. Only three studies reported on the relationship between health care support workers and outcomes. None of the studies looked at the effect of staffing levels on staff outcomes such as staff retention, job satisfaction or sickness.

## Outcomes for mothers and babies

Nine studies examined the outcomes for mothers during or after birth. Post-partum haemorrhage (odds ratio [OR] 0.43) and maternal readmission (relative risk [RR] 0.96) were reduced, while intact perineum increased with higher levels of registered maternity staff (RR 1.13). Rates of severe maternal outcomes were lower with more nurses (OR 0.48) but not midwives (OR 1.81). Rates of multiple complications were higher with more staff in one study (14.3% vs 11.6%), although there was no adjustment for population risk. This result could arise if high risk mothers attend units with higher staffing.

Ten studies examined the outcomes for babies. In areas with more registered staff, lower rates of neonatal resuscitation (35.9% vs 38.2%) and admission to the

neonatal unit (2% vs 9%) were reported along with increased exclusive breastfeeding (88% vs 78%). There was a mixed direction of results for Apgar score and birth asphyxia, and almost identical rates for stillbirth, perinatal complications and neonatal death in areas with different staffing levels. Neonatal readmission, hypoglycaemia, jaundice, weight loss and sustained breastfeeding were not studied, and this presents a gap in the evidence.

## Outcomes during labour

Studies reported on the completeness of documentation, foetal monitoring, use of Oxytocin to accelerate labour, epidural use, length of labour and the timing of emergency caesarean section in relation to staffing. In seven of the 19 comparisons, more staff were associated with significantly improved outcomes. For example, the target of 15 min transfer time to theatre for emergency caesarean was rarely missed when more midwives were present. When there were more midwives, 49.7% of women had an epidural or spinal for pain relief, compared to 58.3% when there were fewer midwives. Ten comparisons show improved outcomes with more staff, but they did not reach statistical significance. Two comparisons were in the opposite direction but were also not statistically significant. There were no clear patterns in the evidence relating to mode of birth as an outcome measure, despite being measured in 10 studies.

## Research on support workers

Three studies examined associations between support worker staffing and outcomes, including mode of birth, healthy mothers, healthy babies and risk of readmission. Researchers found that increasing support workers was associated with a reduction in birth interventions for low risk women, but found effects in the opposite direction for health outcomes in mothers and babies [9]. All three studies adjusted for the contribution of midwives and medical staff when performing their analyses.

## What are the knowledge gaps?

Most maternity staffing research has focussed on labour care and care immediately after birth; few studies have examined staffing levels and skill mix on antenatal wards or postnatal wards. Studies could be expanded to include other outcomes of relevance, including maternal mental health, sustained breastfeeding, jaundice and weight loss in babies. These wider settings and outcome measures would be a useful addition to the body of evidence.

Many of the studies presented are cross-sectional in design. It is therefore not possible to conclude that staffing levels preceded or had a causal effect on the outcomes. Ascertaining whether outcomes followed exposure to staffing is important in trying to attribute effects to exposures.

Study design can also be improved by measuring staffing levels as close to the patient as possible and adjusting for other factors that could influence the outcome, e.g. parity or gestational age.

It is timely to plan further research on support workers and the costs and consequences of different skill mix arrangements. This is important as the number of full-time-equivalent support workers has increased by 12.6% from 2019-2020 which is over twice the rate of growth in registered staff [10].

## Conclusions

There is some evidence that higher midwifery staffing is associated with better outcomes. The evidence is not conclusive and is lacking in some areas. Further research is needed to clarify this relationship especially as the workload and skill mix is changing in maternity units without evidence to guide staffing decisions.

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