Policy+
Policy plus evidence, issues and opinions in healthcare
Issue 30 • May 2011

RM+RM=better midwifery care. What do we know about associations between registered midwife staffing levels and better care for women?

Growing research evidence suggests that there is a strong link between nurse staffing and patient outcomes in the acute sector. However, there is limited empirical evidence on the relationship between maternity staffing, maternity workforce characteristics and birth outcomes. Such evidence is much needed, given current policies aimed at improving maternity care. In this Policy Plus we draw on work undertaken by the National Nursing Research Unit that sought to assess the feasibility of using routinely available data to measure the impact that maternity staffing has on birth outcomes in maternity services at trust level in England (1).

Why investigate maternity staffing and outcomes?

Government and NHS policies have staffing implications for the maternity services: for example: choice of place of birth; continuity of care; one-to-one midwifery support during labour; safety; improving productivity and efficiency of the health sector, and NHS budgetary constraints. Other major concerns with staffing implications relate to rising birth rates and older mothers with complex health needs; ageing of the workforce; changes in graduate training; and the European Working Time Directive which affects the provision of 24-hour care. National policy in England advocates 'normal birth' (i.e. birth without medical intervention) as a desirable outcome (2) with inadequate midwife staffing levels consistently cited as an impediment to achieving this goal (3) and to safe care in general (4). Similar concerns are expressed in relation to medical staff; in particular over low numbers and lack of experience (4).

A key concern in the Care Quality Commission's 2008 review of maternity services was that in some trusts "levels of staffing were well below average, indicating that they may have been inadequate"(5) . The review also found wide variations in staffing levels between trusts even when standardised against the number of births; variations in provision of midwife supervisors within the trusts; variations in clinical outcomes; poor attendance at in-service training courses, and evidence of cultural differences between doctors and midwives.

How can existing data be used to investigate maternity staffing and outcomes?

In our study, we used *Admitted Patients HES* data from Dr Foster (April 2008 – March 2009) and accessed data for 144 trusts out of 150 which provide maternity care in England (615042 mothers). The following variables were included in our models: readmissions within 28 days of the birth to any hospital (outcome); age and ethnicity of mother; Carstairs deprivation index; Charlson co-morbidity index; delivery type; professional delivering; number of admissions in the previous 12 months, and pre-and post-birth length of stay. We selected the staff variables from the *Maternity Matters Benchmarking* dataset (2008) and matched them at trust level to the *Admitted Patients HES* data (1). These included five levels of medical staff, two levels of midwife, registered nurses, nursery nurses and healthcare assistants (all expressed as full- time equivalents (FTE).

The study only explored "readmission within 28 days" as an outcome, defined as number of women being readmitted to any hospital within 28 days after discharge from the postnatal ward. Logistic regression analysis was undertaken at patient level and Poisson regression at trust level, using SPSS. Expected readmissions were estimated from the patient level model and used as an offset in the trust level model. The relative risk of being readmitted for each woman in each trust was calculated by dividing the actual number of readmissions at 28 days to expected readmissions, obtained from the logistic regression model.

King's College London

National Nursing Research Unit

National Nursing Research Unit
Florence Nightingale School of Nursing & Midwifery at King's College London
James Clerk Maxwell Building
Waterloo Campus
57 Waterloo Road
London SE1 8WA

Tel 020 7848 3057
Email nnru@kcl.ac.uk

Associations between re-admissions and staffing

There was a significant relationship between all staffing variables and readmissions ($p<0.001$).
*Higher numbers of midwives (full-time equivalents (FTE))per births was associated with a lower probability of readmission.
*A higher ratio of consultant obstetricians and gynaecologists (O&G) FTE to midwives FTE was associated with a lower probability of readmission, as was a higher ratio of consultant midwives FTE to midwives FTE.
*A higher ratio of registered nurses FTE to midwives FTE was associated with a higher probability of readmission.
However, risk adjustment was limited in the model and the possibility remains that further risk adjustment might alter the relationships. The question remains of whether the reasons for readmission are a direct consequence of the original procedure/intervention, or to do with the level of aftercare, or the patient's own actions.

Conclusions and implications

Implications for policy

The relationships we demonstrated are certainly plausible with the better outcomes consistently associated with higher levels of more experienced and more highly qualified staff. The findings have potentially significant economic implications in terms of cost of readmissions and related staff costs but also costs associated with the higher staffing ratios implied.

Implications for further research

Aspects of the findings meriting further investigation: The finding of poorer outcomes associated with a higher ratio of registered nurses to midwives warrants further investigation into the role of nurses on maternity wards in order to understand how nurses are deployed and whether there is some work substitution between registered nurses and midwives. The presence of obstetricians on labour wards is also worthy of further exploration.

Available data had information on the level of FTE healthcare assistants in maternity services, which did not differentiate between maternity support workers and maternity care assistants. Healthcare assistants were excluded from the model because of a high correlation with other staff groups. Support workers may become a more significant part of the workforce (6) and should therefore be included in future analysis.

Including additional outcomes in modelling relationships

Given that only one outcome (re-admission) was used and that there will be differing risk factors for other birth outcomes, more confidence could be placed in the conclusions if results were consistent across outcomes.

Future methods should include multilevel logistic regression at trust and patient level and should strive to incorporate additional variables such as midwifery and other maternity staff workforce characteristics, grades, skill mix, job relevant training, supervision and turnover. Additional maternal characteristics such as previous mode of birth, parity, multiple births, gestational age and co-morbidities such as diabetes, hypertension, renal disease, cardiac disease and obesity should be considered to attempt to improve the predictive power of the risk model.

Key issues for policy

- The results to date support assertions that adverse outcomes are potentially associated with lower midwifery staffing levels, with implications for the current safety and quality of care policy agenda (2).
- There is a limitation to what can ultimately be learned by modelling associations between staffing levels without consideration of the complex interactions involved; for example how staff should be deployed to maximise clinical and cost effectiveness.
- Within a fixed budget, consideration is needed as to whether it is better to have higher numbers of more qualified and skilled staff but fewer staff overall, as opposed to more staff overall but fewer of the more highly qualified and skilled groups.
- There is considerable scope for economic modelling if the underlying effectiveness model is robust.

The National Nursing Research Unit is an independent research unit which receives funding from the Department of Health's Policy Research Programme. The views expressed in Policy+ are those of the authors, not the Department of Health.

Policy+ (Print) ISSN 1758-6194 · Policy+ (Online) ISSN 1758-6208

References and information

References
1. NNRU 2010 report http://www.kcl.ac.uk/content/1/c4/33/06/NNRUMidwiferyReportDec10.pdf

2. Department of Health (2007), 'Maternity Matters: choice, access and continuity of care in a safe service '.

3. Page, L (2003), 'When normal birth is in the minority', *BRITISH JOURNAL OF MIDWIFERY,* 11 (6), 356-56.

4.Smith, A. H. K., Dixon, A. L., and Page, L. A. (2009), 'Health-care professionals' views about safety in maternity services: a qualitative study', *Midwifery,* 25 (1), 21-31.

5. Health Care Commission (2008), 'Towards Better Births. A review of maternity services in England'.

6. P Prowse, J and Prowse, P (2008), 'Role redesign in the National Health Service: the effects on midwives' work and professional boundaries', *Work, Employment & Society,* 22 (4), 695.