



An assessment of the cost-effectiveness of midwife-led care in the United Kingdom

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ABSTRACT

Objectives: to analyse the existing evidence on the cost-effectiveness of midwife-led care compared with consultant-led care in settings potentially generalisable to the United Kingdom, and to estimate the potential cost savings accruing from an expansion of midwife-led care in the United Kingdom.

Design: a systematic review of the literature was conducted across twelve electronic databases for papers relating to the costs of midwife-led models of care. Randomised controlled trials, controlled clinical trials, controlled before and after studies and interrupted time series studies were considered for inclusion. The methods specified by the National Institute for Health and Clinical Excellence to assess the cost-effectiveness of midwife-led care were broadly used. Multiple simple one-way sensitivity analyses were undertaken to examine the robustness of findings to varying scenarios.

Findings: based on scant existing evidence, the mean cost saving for each eligible maternity was estimated at approximately ST£12.38 (sterling). If midwife-led services were expanded to 50% of all eligible women in the UK, as assumed in the main set of results, this would result in an aggregate cost saving of ST£1.16 million per year. In the sensitivity analyses, cost changes per maternity vary from a saving of ST£253.38 to a cost increase of ST£108.12 depending on the assumptions used, corresponding to aggregate savings of ST£23.75 million and a cost increase of ST£10.13 million.

Key conclusions: expanding midwife-led maternity services for eligible women may offer a means of reducing costs compared to the current leading model of care. However, firm conclusions are elusive due to the paucity of evidence.

Implications for practice: there is a clear need for further economic evaluations of models of maternity care in the United Kingdom context to guide the better use of scarce resources.

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Introduction

Health-care systems are faced with the twin challenges of cost-control and quality improvement. Adapting skill mix to meet the needs of health-care users cost-effectively is an important instrument for fulfilling these goals. In the United Kingdom (UK), the majority of maternity care is provided through the National Health Service (NHS) across a complex variety of birth settings including obstetric units, alongside midwifery units, freestanding midwifery units and birth at home. The majority of births (> 90%) take place in obstetric units (Healthcare Commission, 2008) where care is provided by a team of midwives and obstetricians

with an obstetrician taking lead responsibility for women of elevated risk status for pregnancy and birth and midwives taking lead responsibility for women of low-risk (Stewart et al., 2004). Midwives take primary professional responsibility for the care of women in alongside and freestanding midwifery units and for births at home with referral for specialist, including obstetric care, as required.

It has been suggested that there may exist some degree of efficiency gain through modifying the roles and responsibilities of doctors and midwives (e.g., Twaddle and Young, 1999; Bellanger and Or, 2008). It is important to identify these potential gains to enable better use of inevitably limited resources. This paper analyses the existing evidence on the cost-effectiveness of midwife-led care, whereby midwives are the primary lead professional for eligible women with referral for obstetric review and/or care as required, compared with consultant-led care. An estimate is made of the potential cost savings accruing from an expansion

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of midwife-led care in the UK. This paper is based on work commissioned by the Royal College of Midwives and reported by the authors (Devane et al., 2010).

Methodology

Literature review

We searched across the following 12 electronic databases:

- Maternity and Infant Care (MIDIRS).
- Applied Social Sciences Index and Abstracts (ASSIA).
- The Health Management Information Consortium (HMIC).
- Cochrane Database of Systematic Reviews (CDSR).
- Cochrane Central Register of Controlled Trials (CENTRAL).
- Medical Literature Analysis and Retrieval System Online (MEDLINE).
- The Cumulative Index to Nursing and Allied Health Literature (CINAHL).
- ExcerptaMedica Database (EMBASE).
- Database of Abstracts of Reviews of Effects (DARES).
- Health Technology Assessment Database.
- NHS Economic Evaluation Database (NHSEED).
- Cochrane Methodology Register.

We developed and tested a detailed search strategy for each database that avoided any study design delimiter thus increasing the likelihood of finding relevant studies (Appendix A). We also searched the reference list of all potentially eligible studies for other potentially eligible studies. Our search was restricted to English language publications. Randomised controlled trials (RCT), controlled clinical trials (CCT), controlled before and after studies (CBA) and interrupted time series studies (ITS) were considered for inclusion. Design and inclusion characteristics of RCTs, CCTs, CBAs and ITSs were based on criteria used in the Cochrane Effective Practice and Organisation of Care (EPoC) group guidelines (see <http://epoc.cochrane.org/epoc-resources-review-authors>). Interventions that focus on a midwife-led model of care, where midwife-led care is provided in the intrapartum period with or without ante and/or postpartum care were included, for all women irrespective of their perceived 'risk' status.

Papers relating to the costs of care were then selected and considered for inclusion if they:

1. considered costs as well as other outcomes (e.g., clinical outcomes),
2. compared a midwife-led model of care, as defined above, with consultant-led care, and
3. were based in the UK or a setting potentially generalisable to the UK.

Studies were excluded if:

1. the focus of the study was on specific interventions (e.g. midwife-led debriefing after operative birth) rather than a midwife-led model of care and
2. in a language other than English.

Economic evaluation

This study broadly used the methods specified by the National Institute for Health and Clinical Excellence (NICE) to assess the cost-effectiveness of midwife-led care (NICE, 2009). The measure of health gains used is the quality-adjusted life year (QALY), a

generic and single index criteria that captures both reductions in mortality and morbidity (quantity and health related quality of life, respectively). The QALY thus satisfies the need for a consistent but sufficiently sensitive measure that can be used across clinical decisions (Sculpher and Claxton, 2005).

The costs of implementing an intervention can be divided into a number of categories. Fixed costs, such as a hospital building, are not directly dependent on the delivery rate (at least in the short term). Semi-fixed costs such as midwives salaries depend on the number of births but not in a strictly linear fashion. Variable costs such as drugs, by contrast, are directly dependent on the number of maternities (Drummond et al., 2005).

The NICE framework is based on an understanding that there are two simultaneous but conceptually distinct decisions facing any collective health-care system i.e. whether a health intervention should be adopted based on current evidence and whether additional evidence is required to support the adoption of the intervention.

The decision to adopt or reimburse an alternative (j) is based on expected costs (C_j), expected outcomes—specified in QALYs (Q_j), and an exogenous budget threshold (λ). The budget threshold can represent either (i) the value of health gains foregone with adoption of j due to the displacement of existing technologies or (ii) the cost per additional QALY that could be achieved with an augmentation of the health budget.

Costs and outcomes occurring in different periods are adjusted into the present timeframe using the discount rate of 3.5% per year. The cost-effectiveness of j can then be expressed in terms of net benefit (Phelps and Mushlin, 1991; Stinnett and Mullahy, 1998):

$$NB_j = Q_j\lambda - C_j$$

With current information, the intervention with the maximum expected net benefit should then be chosen. It can be noted that decisions are based on mean net benefit, irrespective of any notions of statistical significance. This is because failure to adopt an intervention with a positive but uncertain mean net benefit would impose opportunity costs, of health gain foregone, on those who could benefit from the estimated optimal treatment (Claxton, 1999).

The NICE framework recommends the use of value of information (VOI) analysis to guide the second decision on whether additional evidence is required to support a recommendation (NICE, 2009). This study did not use VOI analysis, but instead simple one-way sensitivity analysis was undertaken to examine the robustness of findings when key parameters were systematically varied. Some recommendations for further research are drawn.

Findings

Four RCTs met the criteria for inclusion and are analysed using a format based on the quality guidelines devised by Drummond and Jefferson (1996) (Table 1).

Hundley et al. (1995) conducted a cost effectiveness analysis within the context of an RCT in Scotland (Hundley et al., 1994). The costs of intranatal care were examined for 2844 low-risk women in a midwife-led unit (MLU) within a hospital compared to a consultant-led unit (CLU). The MLU was staffed by midwives who rotated into the CLU according to clinical need. Analysis was by intention to treat, which minimises bias associated with non-random loss of participants.

Costs increased by ST£66 (sterling) per maternity in the MLU vs. the CLU, as shown in the table above. However, a scenario analysis investigated the impact of varying key parameters such as increased midwife staffing levels and the capital costs of converting a section of the traditional delivery suite into a

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