Routine examination of the newborn: the EMREN study. Evaluation of an extension of the midwife role including a randomised controlled trial of appropriately trained midwives and paediatric senior house officers

J Townsend,1* D Wolke,2 J Hayes,3 S Davé,3 C Rogers,4 L Bloomfield,3 E Quist-Therson,5 M Tomlin4 and D Messer2

1 Public and Environmental Health Research Unit, London School of Hygiene and Tropical Medicine, London, UK
2 Department of Psychology, University of Hertfordshire, Hatfield, UK
3 Centre for Research in Primary and Community Care, University of Hertfordshire, Hatfield, UK
4 Department of Midwifery and Child, University of Hertfordshire, Hatfield, UK
5 Mount Vernon and Watford Hospitals NHS Trust, Watford, UK

* Corresponding author

Executive summary

Health Technology Assessment 2004; Vol. 8: No. 14
**Objectives**

To assess the implications and cost-effectiveness of extending the role of midwives to include the routine (24-hour) examination of the healthy newborn. The main comparison is examination by a midwife specifically trained for the examination (ENB N96), with standard practice, which is routine examination by a paediatric senior house officer (SHO).

To assess the value of a repeat examination by a community midwife at home at 10 days.

**Design**

The study included a prospective randomised controlled trial (RCT) with mother and baby dyads randomised to either SHO or midwife for the routine examination of the newborn. In addition, a sample of midwives and SHOs were videoed while performing the examinations and the videotapes were rated by an independent consultant and senior midwife. Interviews were held with health professionals and mothers for qualitative assessments of their opinions; a National Survey of current practice was conducted; there were consultations with representatives of professional bodies and relevant consumer bodies and cost implications were assessed.

**Setting**

A District General Hospital (for the RCT), a London Teaching Hospital, general practices and mothers’ homes (for interviews); questionnaires were sent to all maternity units in England (for the National Survey).

**Subjects**

Mother and baby dyads in a District General Hospital in south-east England who fitted the inclusion criteria for examination by midwife were potentially included in the RCT; all midwives and SHOs examining during the research period were included in the video study; a midwifery manager and a named paediatric consultant in each midwifery/paediatric unit in England were included in the National Survey; purposively selected samples of 10 midwives, SHOs, general practitioners and new mothers; representatives of the Royal College of Midwives, the Royal College of Paediatric and Child Health, the Royal College of General Practitioners, the Nursing and Midwifery Council, the English National Board, the Maternity Alliance and the Association of Improvement of Maternity Services for the interviews.

**Interventions**

The intervention consisted of a routine examination of a newborn baby at about 24 hours from birth and a further examination for half the babies in each group, at 10 days at home by the community midwife; 826 mother and baby dyads were included in the study.

**Main outcome variables**

Maternal satisfaction assessed on a range of aspects, shortly after the examination, and again at 3 months. Referral assessed as appropriate and as major or minor, by three independent consultants. Problems identified during the first year of life assessed as identifiable at 24 hours. Quality assessment by video, rated independently by two consultants and two senior midwives against an agreed written proforma. Opinion of professionals and mothers about aspects of the examination.

**Results**

There was no statistical difference between SHO and midwife examinations in appropriate referral rates to hospital or community or in inappropriate referral rates to hospital. Midwives made more informal community referrals to general practitioners or community midwives. For problems occurring in the first year of life, there were no significant differences between the groups in problems either identified or not identified at 24 hours.
In the audio-visual quality assessment, for each item where significant quality differences between examinations were identified, the item was rated as carried out more appropriately by the midwives than by the SHOs. Major differences were found for examination of the heart and lungs, for overall quality of the examination and in communication skills. Overall quality of the physical examination by midwives was rated as good or very good by the midwife raters for 78% of the examinations and by paediatric consultant raters for 23%. Corresponding figures for SHO examinations were 12 and 0%.

Overall maternal satisfaction was high, with 81% (547/674) of mothers reporting that they were satisfied or very satisfied with the newborn examination. However, mothers were more satisfied when a midwife rather than an SHO examined their babies. The discussion of healthcare issues by the examiner and continuity of care were both significantly related to higher satisfaction. Midwives were significantly more likely to discuss healthcare issues such as feeding, sleeping and skin care than were SHOs (61 versus 33%), and could provide continuity of care. After controlling for both of these factors and for history of miscarriage, maternal satisfaction was no longer significantly related to randomised group.

Few new health problems were identified at the extra 10-day examination.

From the National Survey, it was estimated that about 2% of babies in England are examined by a midwife, although 44% (74/167) of midwifery units had midwives (median of two) with a postregistration qualification in the examination of the newborn. Of these units, 51% (38/74) reported that all and 18% (13/74) reported that some of these trained midwives conducted the examination. About one-third (23/74) of those so trained were not examining at all. Reported referral rates were very similar at 6.8% for SHOs and 6.6% for midwives. In 60% (103/173) of units, all babies were examined before discharge. In the remaining 40% (70/173), a median of 3% were transferred home without the examination and were examined mostly by a GP. About 1% of babies born in hospital were examined at home. None of the consultants or midwifery managers had major objections to midwives examining; with training and resources, midwife examination was acceptable.

Twelve universities in England were identified as approved to train professionals for the N96 programme with 286 completions over 4 years. Nearly all those trained were midwives, although the courses were open to other professionals, notably doctors and health visitors.

In the interviews with health professionals and mothers, there was general agreement that either SHOs or midwives were appropriate to carry out the examinations if trained; most mothers had no preference provided that the person was qualified and trained. SHOs reported that they had received little training for the examination.

Costs

Costs were considered in terms of three different scenarios suggested in the interviews with the representatives of the professional organisations. If midwives were to examine all babies where there were no complications of birth or antenatal history (i.e. about 50% of newborns), there would be savings of about £2 per baby born, equivalent to savings of £1.2 million nationally per annum. Were midwives to examine all babies on normal wards (i.e. about 90% of newborns as recommended by some of the professional bodies), with other babies examined by registrars, there would be savings of about £4.30 per baby born or £2.5 million nationally per annum. Were there no extension of midwife examination, but registrars were to examine instead of SHOs, there would be an extra cost of about £1 per baby or £0.4 million nationally per annum. There were differences of opinion between the paediatric representatives and the midwives about whether all or only selected midwives should examine. This would have implications, particularly for costs of training, and these issues would need to be agreed by the professional bodies concerned. There would be likely costs of training of £0.1 million nationally for 4 years for midwives or £0.56 million (£0.47–0.65 million) ongoing annually for SHO training. Overall, the economic implications of any of the scenarios were not major but mostly would imply some net costs to midwifery departments.

Professional opinion

All the representatives of the professional bodies were of the opinion that having trained midwives, carrying out the examination would be valuable. Concern was expressed about the SHOs examining without formal training, although
the need for them to have experience of examining healthy babies was stressed. Midwife representatives of professional bodies suggested that certain other aspects of both training and practice could be omitted to allow time for midwives to examine the newborn.

Conclusions

All component aspects of the study were consistent in showing benefits or at least no significant barriers to suitably qualified, trained midwives carrying out the examinations. It was surprising, given the findings, that midwives currently examine only 2% of babies and that some N96 trained midwives are not carrying out examinations.

Implications for the health services

Developing the role of the midwife to include examination of the newborn would slightly reduce overall health service costs, with some increased resources needed by midwifery departments, and some decrease in resource needs of paediatric departments. This is likely to result in improved quality of examinations and higher satisfaction from mothers. There would be need for appropriate training of midwives, possibly as part of core preregistration training. Consideration would need to be given to how and when midwives would be trained and the criteria for babies to be examined. An overall improvement in examination of babies’ hips is needed.

Recommendations for further research

There is a need for research into:

- the value of the examination being carried out at home rather than in hospital
- the overall unsatisfactory quality of the examination of the hips
- appropriate inclusion criteria for which babies’ midwives should examine.

Publication

How to obtain copies of this and other HTA Programme reports.

An electronic version of this publication, in Adobe Acrobat format, is available for downloading free of charge for personal use from the HTA website (http://www.hta.ac.uk). A fully searchable CD-ROM is also available (see below).

Printed copies of HTA monographs cost £20 each (post and packing free in the UK) to both public and private sector purchasers from our Despatch Agents.

Non-UK purchasers will have to pay a small fee for post and packing. For European countries the cost is £2 per monograph and for the rest of the world £3 per monograph.

You can order HTA monographs from our Despatch Agents:

– fax (with credit card or official purchase order)
– post (with credit card or official purchase order or cheque)
– phone during office hours (credit card only).

Additionally the HTA website allows you either to pay securely by credit card or to print out your order and then post or fax it.

Contact details are as follows:

HTA Despatch

c/o Direct Mail Works Ltd
4 Oakwood Business Centre
Downley, HAVANT PO9 2NP, UK

Email: orders@hta.ac.uk
Tel: 02392 492 000
Fax: 02392 478 555
Fax from outside the UK: +44 2392 478 555

NHS libraries can subscribe free of charge. Public libraries can subscribe at a very reduced cost of £100 for each volume (normally comprising 30–40 titles). The commercial subscription rate is £300 per volume. Please see our website for details. Subscriptions can only be purchased for the current or forthcoming volume.

Payment methods

Paying by cheque
If you pay by cheque, the cheque must be in pounds sterling, made payable to Direct Mail Works Ltd and drawn on a bank with a UK address.

Paying by credit card
The following cards are accepted by phone, fax, post or via the website ordering pages: Delta, Eurocard, Mastercard, Solo, Switch and Visa. We advise against sending credit card details in a plain email.

Paying by official purchase order
You can post or fax these, but they must be from public bodies (i.e. NHS or universities) within the UK. We cannot at present accept purchase orders from commercial companies or from outside the UK.

How do I get a copy of HTA on CD?

Please use the form on the HTA website (www.hta.ac.uk/htacd.htm). Or contact Direct Mail Works (see contact details above) by email, post, fax or phone. HTA on CD is currently free of charge worldwide.

The website also provides information about the HTA Programme and lists the membership of the various committees.
The research findings from the NHS R&D Health Technology Assessment (HTA) Programme directly influence key decision-making bodies such as the National Institute for Clinical Excellence (NICE) and the National Screening Committee (NSC) who rely on HTA outputs to help raise standards of care. HTA findings also help to improve the quality of the service in the NHS indirectly in that they form a key component of the ‘National Knowledge Service’ that is being developed to improve the evidence of clinical practice throughout the NHS.

The HTA Programme was set up in 1993. Its role is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS. ‘Health technologies’ are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care, rather than settings of care.

The HTA programme commissions research only on topics where it has identified key gaps in the evidence needed by the NHS. Suggestions for topics are actively sought from people working in the NHS, the public, consumer groups and professional bodies such as Royal Colleges and NHS Trusts. Research suggestions are carefully considered by panels of independent experts (including consumers) whose advice results in a ranked list of recommended research priorities. The HTA Programme then commissions the research team best suited to undertake the work, in the manner most appropriate to find the relevant answers. Some projects may take only months, others need several years to answer the research questions adequately. They may involve synthesising existing evidence or designing a trial to produce new evidence where none currently exists.

Additionally, through its Technology Assessment Report (TAR) call-off contract, the HTA Programme is able to commission bespoke reports, principally for NICE, but also for other policy customers, such as a National Clinical Director. TARs bring together evidence on key aspects of the use of specific technologies and usually have to be completed within a limited time period.

The research reported in this monograph was commissioned by the HTA Programme as project number 94/40/05 (ISRCTN 89169926). As funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors’ report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

The views expressed in this publication are those of the authors and not necessarily those of the HTA Programme or the Department of Health.

HTA Programme Director: Professor Tom Walley
Series Editors: Professor John Gabbay, Dr Chris Hyde, Dr Ruairidh Milne, Dr Rob Riemsma and Dr Ken Stein
Managing Editors: Sally Bailey and Caroline Ciupek

Criteria for inclusion in the HTA monograph series
Reports are published in the HTA monograph series if (1) they have resulted from work commissioned for the HTA Programme, and (2) they are of a sufficiently high scientific quality as assessed by the referees and editors.

Reviews in Health Technology Assessment are termed ‘systematic’ when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.