Randomized comparison of home and clinic follow-up visits after early postpartum hospital discharge


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
A single postpartum home visit to each mother-newborn pair within 48 hours after hospital discharge by a registered nurse or a public health nurse from the Health Maintenance Organization's (HMO) home visit department. The nurses in the intervention (home visit) programme had received 30 hours of training in newborn care 1 year before the study. The month before the study, the home health nurses were given an additional 16 hours of didactic instruction and preceptorship in breastfeeding, newborn and maternal history and physical examination, and anticipatory guidance. The clinical protocol (based on recommendations in Bright Future, a national guideline for preventive maternal and child health care) and a standardised charting form specified the recommended elements of history, physical examination, and anticipatory guidance for home visits, which were intended to last 60 to 90 minutes.

Type of intervention
Supportive care and primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Medically and socially low-risk mother-newborn pairs with uncomplicated delivery, who delivered at an integrated health maintenance organisation, and who planned to seek follow-up care at the study institution. The exclusion criteria covered the following three sets of patients: (1) those who planned to receive follow-up care at one of the study institution's clinics because routine follow-up care at that site involved group paediatric clinic visits rather than the individual paediatric clinic visits used at the other sites; (2) those mother-newborn pairs with medical problems such as infants weighing under 2,500g or over 4,600g at birth, those having stayed in the intensive care nursery, or those having a medical problem warranting follow-up by a paediatrician or nurse practitioner, those newborns with a haematocrit of less than 40 or an absolute neutrophil count of less than 7,000 at any time; those with anticipated length of stay of more than 48 hours (usually due to cesarean delivery); (3) those with potential social problems such as those mothers who were 14 years or younger, 15 to 17 years old without a parent or guardian available for informed consent. Those with a positive toxicology screen for drugs of abuse after admission to labour and delivery, or if a social worker had requested a home visit before eligibility assessment for the study. Those pairs with the mother speaking languages other than English or Spanish, the newborn not being covered by the HMO or being adopted, the family living outside the area served by the home health nurses, not being reachable by telephone, or being in the process of moving were also excluded.

Setting
A hospital setting (an integrated health maintenance organization (HMO)) and outpatient clinics. The economic analysis was carried out in Sacramento, California, USA.

Dates to which data relate
Effectiveness and resource use data corresponded to the low-risk mother-newborn pairs who delivered in the study institution during the period July 1996 to September 1997. The price year was not explicitly specified.

**Source of effectiveness data**
The evidence for the final outcomes was based on a single study.

**Link between effectiveness and cost data**
Costing was performed on the same patient sample as that used in the effectiveness analysis and appears to have been conducted retrospectively.

**Study sample**
Power calculations were used to determine the sample size. The initial sample size was selected to have 80% power to identify a 20% reduction in newborn urgent clinic visits at a 2-tailed alpha of 0.05. Of the 3,199 deliveries in the study hospital during the study period, a total of 1,431 mothers were offered enrolment, of whom 1,163 (81%) agreed to participate in the study. Of the patients agreeing to participate, 580 mother-newborn pairs with a mean (SD) mother age of 27.9 (6.2) years were randomly allocated to the home visit group versus 583 pairs with a mean (SD) mother age of 27.8 (6.9) years to the clinic visit group. 7 nurses conducted the home visits. Nurse practitioners and paediatricians at 4 clinics conducted the paediatric visits.

**Study design**
This was a randomised controlled trial, carried out in an HMO hospital which was linked to 5 affiliated outpatient clinics. The duration of the follow-up was until telephone interviews at two weeks and 12 weeks after delivery (postpartum). Of the subjects randomised to the home visit group, 12 received clinic visits and 9 did not receive follow-up visits. 6 subjects did not have follow-up telephone interviews at two weeks and 11 subjects did not have follow-up telephone interviews at 12 weeks. Of the subjects randomised to the clinic visit group, 2 received home visits and 24 did not receive follow-up visits. 10 subjects did not have follow-up telephone interviews at two weeks and 18 subjects did not have follow-up telephone interviews at 12 weeks. To minimise any potential effects on the mother's length of stay, the research nurses attempted to enrol mothers after the decision to discharge them had been made. Randomisation was performed by a series of sealed, opaque, sequentially numbered envelopes containing study group assignments determined in advance by a random number generator.

**Analysis of effectiveness**
The principle used in the analysis of effectiveness was intention to treat. The clinical outcome measures were rehospitalisations, emergency department (ED) visits, urgent clinic visits by the mother or newborn during the 10 days after delivery, breastfeeding discontinuation, maternal depressive symptoms, a combined clinical outcome (if either the mother or the newborn had experienced any of the above outcomes), and maternal satisfaction. The latter was assessed by using questions from a validated instrument on consumer satisfaction modified to address perinatal needs and services. At 2 weeks' postpartum, a research interviewer contacted each mother by telephone to conduct a 15-minute interview about prenatal care and breastfeeding. The Centre for Epidemiologic Studies Depression Scale (CES-D), a widely used 20-item instrument that has been validated in English and Spanish, was used to evaluate maternal depressive symptoms using a cut-off score of 16 or more. A second telephone interview was conducted focusing on breastfeeding at 12 weeks' postpartum. Multivariate logistic regression models were used to adjust for the effects of any differences in predictor variables observed in preliminary analysis on group differences in clinical outcomes and maternal satisfaction. Those who refused to participate in the study were found to be comparable with enrolees with respect to the infant's birth weight, Apgar scores, the mother's race/ethnicity, or the newborn's length of stay. Mothers who enrolled were slightly older than those who declined. The randomised groups had two significant differences in demographic characteristics and prenatal experiences. Mothers in the home visit groups were slightly less likely to have initiated prenatal care during the first three months of pregnancy (89% versus 93%; p=0.03) and to have at least a high school degree (91% versus 94%; p=0.05).
Effectiveness results
No significant differences between the study groups were observed in terms of individual clinical outcomes. The same was true for the combined clinical outcome. In contrast, higher proportions of mothers in the home visit group rated as excellent or very good the preventive advice delivered (80% versus 44%), the provider's skills and abilities (87% versus 63%), the newborn's posthospital care (87% versus 59%), and their own posthospital care (75% versus 47%); \( p=0.001 \) for all above comparisons. Subgroup analysis (such as subgroups with demographic risk factors, mothers with less than a high-school degree, etc.) revealed no significant differences on the combined clinical outcome measure.

Clinical conclusions
The study findings suggest that either type of follow-up is clinically acceptable among medically and socially low-risk patients with good access to care. However, mothers who received home visits reported markedly greater satisfaction not only with the visit itself, but also with their overall maternal and newborn postpartum care.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcomes were reported.

Direct costs
Costs were not discounted due to the short time frame of the cost analysis. Some quantities were reported separately from the costs. Cost items were not reported separately. Cost analysis covered the costs of clinic visits, ED visits, and hospitalisations using the HMO's computerised databases. The HMO's computerised Cost Management Information System, estimating the costs of each unit of service using standard step-down accounting methods, was utilised to obtain the average regional costs of the services. Personnel time, supply costs, and administrative overhead were incorporated into the costs of each unit of services. The costs of home health visits were based on personnel time, mileage, space, administration, and overhead costs using methods similar to those mentioned previously. The perspective adopted in the cost analysis appears to have been that of the HMO. The price year was not specified.

Indirect Costs
Indirect costs were not considered.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was not carried out.

Estimated benefits used in the economic analysis
The reader is referred to the effectiveness results reported above.

Cost results
The estimated cost of a postpartum home visit to the mother and newborn was $225 versus $120 for a paediatric clinic visit. Additionally, the cost of a 10 minute visit to the obstetric-gynecologic clinic to meet the medical needs of the mother was estimated to be $82 since in the paediatric clinic visit the needs of the mother were not formally addressed.

Authors' conclusions
For low-risk mothers and newborns in this integrated health maintenance organisation, home visits compared with
paediatric clinic visits on the third or fourth postpartum hospital day were more costly, but were associated with equivalent clinical and markedly higher maternal satisfaction.

**CRD COMMENTARY - Selection of comparators**
A justification was provided for the choice of the comparator (the strategy of conducting a paediatric clinic follow-up visit); it was regarded as the usual care in the context in question. You, as a database user, should consider whether this is a widely used health technology in your own setting.

**Validity of estimate of measure of benefit**
The effectiveness results are likely to be internally valid. This is because of the randomised study design, the intention to treat analysis conducted, the use of power calculations to justify the sample size adopted in this study, and the adjustments made for the baseline differences in confounding factors which indicates that stratified randomisation should have been performed. However, it was noted that the study had limited power to identify group differences in terms of rehospitalisation. It was also acknowledged that several aspects of the home and paediatric clinic visits were not equivalent, and the authors could not assess their independent effects (time interval of the visit, rigorous standardisation of the visits' content, and routine examination and discussion of health needs of the mother). The study sample appears to have been representative of a low-risk population with access to an integrated health maintenance organisation. Inclusion and exclusion criteria were extensively reported.

**Validity of estimate of costs**
Some quantities were reported separately from the costs and adequate details of the methods of cost estimation were provided. However, the effects of the different type of postpartum follow-up visits on indirect costs were not addressed. Statistical analyses were performed on some resource use components, but not on cost data. The price year was not given. The cost results may not be generalisable outside the study setting (an integrated HMO).

**Other issues**
The authors' conclusions appear to be justified given the uncertainties in the data. The issue of generalisability to other countries was not addressed, but it was acknowledged that the study results might not be generalisable to higher-risk populations without comparable access to integrated hospital and outpatient care. Some comparisons were made with other studies. The issue of the degree to which the study sample was representative of the study population was addressed by acknowledging that the study results may be limited to low-risk populations with access to an integrated HMO.

**Implications of the study**
Additional research is needed on the effects of alternative postpartum services in higher-risk populations, as well as on group preventive visits and on other postpartum services to promote optimal maternal and newborn health. Decisions on alternative postpartum follow-up services ideally should incorporate the perspectives of all parties in these decisions, including clinicians, insurers, and the mothers and families themselves.

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**Bibliographic details**