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What influence does experience play in heel prick blood sampling?

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KEYWORDS
Heel prick blood sampling;
Guthrie test;
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Experience

Abstract The objective of this study was to investigate the role of 'experience' in performing the heel prick test. Babies ($n = 340$) were randomly allocated to be tested with either the Tenderfoot or Genie Lancet heel prick device. Testing was conducted by nine midwives ($n = 4$, experienced, more than 20 years qualified) who performed the heel prick procedure routinely and rotational midwives ($n = 5$, less experienced, 4—8 years qualified) who only performed the heel prick procedure when working in the community. Test technique outcomes investigated included (1) cleaning of heel, (2) babies position, (3) feeding at test, (4) use of soothing words. Other test outcomes (1) quality of the blood sample, (2) number of heel pricks required to take sample, (3) blood flow, (4) presence of bruising (5) time taken to collect sample, (6) time squeezing the heel and (7) time baby cried were also studied. The experienced midwives were more likely to hold the baby during testing but less likely to clean the infants heel prior to the incision. The experienced midwives collected a better quality sample, in less time and required fewer heel pricks than the less experienced midwifery group.

The heel prick test is routinely taken within the first 10 days of life usually by the community midwife. Despite the relative ease of the heel prick procedure compared to other blood sampling methods, problems still exist including pain for the infant (Sheeran, 1997), anxiety for the parents (Meehan, 1998), complications arising from mild bruising and haematomas (Fleischman, 1992), calcaneal osteomyelitis (Abril et al., 1999; Fleischman, 1992) and cost arising from the need to repeat the test (Grant and Muller, 1993).

The procedure used by midwives today is similar to that followed when the heel prick test was first introduced despite research findings which contradict many of the steps (Shepherd et al., 2004). New guidelines issued in April 2005 suggest that pre-warming of the foot is not essential and that the sample should be taken from a clean heel (UKNSPC, 2005).

A recent study has highlighted great variability in the heel prick technique among midwives

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(Cavanagh et al., 2005). One possible reason for this is that the procedure is predominantly taught by midwife mentors, who teach their own preferred method (Cavanagh et al., 2005). Due to this, the need for the heel prick test to be accredited and for midwives to obtain a certificate of competence has been voiced (Spiel, 1997).

Objective

The main purpose of this study was to investigate the effectiveness of two heel prick devices. An important aspect to the effectiveness of heel prick testing is the experience of the midwife conducting the test. Thus, the purpose of this paper is to determine the influence of midwives' experience of heel prick blood sampling on technique and a number of outcomes including the quality of the blood sample, the number of heel pricks required, blood flow, presence of bruising, time taken to collect the sample, time taken squeezing the heel and the time the baby cried. Preparation of the heel, position of baby during testing and the use of soothing words were also noted.

Participants and design

Approval was granted by the Ethics Committee of the Department of Nursing and Midwifery, University of Stirling, and the local NHS Research Ethics Committee. The sample was drawn from babies born between April and November 2003, in one NHS hospital in Scotland with approximately 1700 deliveries per year.

Healthy babies born at full-term (from 37 weeks gestation), including multiple births, were eligible for entry to the study. Parents were given an information sheet which detailed the study prior to discharge. Due to the introduction, 3 months into the study, of team midwifery in favour of community or hospital based midwives, the number of midwives conducting the heel prick test increased. This led to a reduction in the number of tests the researcher could observe. In order to maximize our sample number, the researcher followed which ever midwife had the largest caseload of tests that day. All parents approached ($n = 341$) had the opportunity to ask the researcher any questions before agreeing to participate and giving their signed consent ($n = 340$).

A randomisation series was computer-generated to allocate the babies into groups (Fig. 1). As the main purpose of the study was to evaluate the effectiveness of two heel prick devices in relation to the quality of blood sample obtained, half of the babies were tested with the Genie Lancet device ($n = 169$) and half were tested with the Tenderfoot device ($n = 171$). To address the hypothesis that heel heating is not required when using the Tenderfoot device, half of these babies had their heels heated prior to the heel prick ($n = 86$) and the other half had no heel heating ($n = 85$). The randomisation scheme was independently prepared by the Computing Science and Mathematics Department of the University of Stirling and delivered to the research assistant in the form of sequentially numbered, sealed opaque envelopes which contained allocation to the appropriate group.

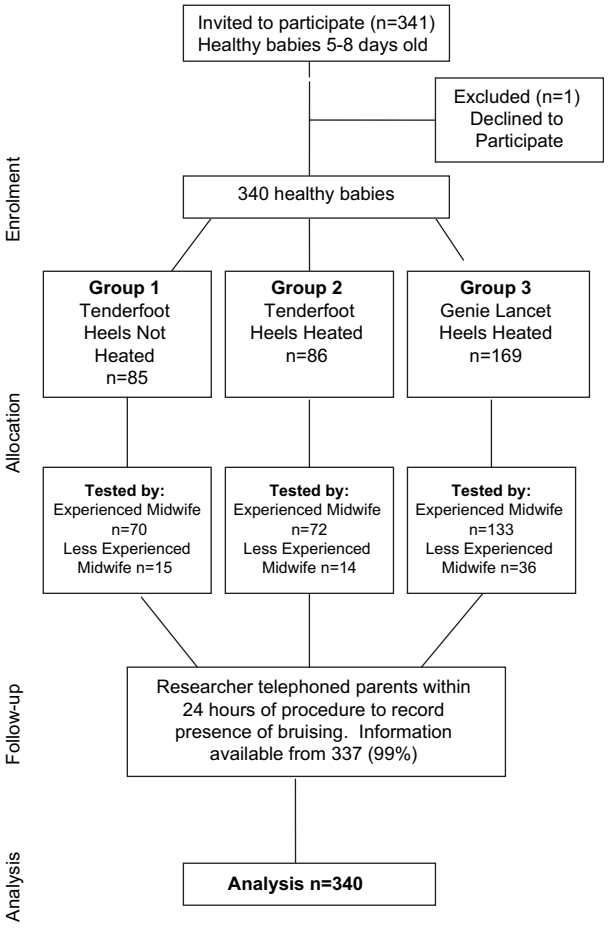

Figure 1 Study profile.

The nine midwives observed were categorised into two groups: community midwives ($n = 4$, experienced, more than 20 years qualified) who performed the heel prick procedure routinely and rotational midwives ($n = 5$, less experienced, 4–8 years qualified) who only performed the heel prick procedure when working in the community.