Safety, Effectiveness and Barriers to Follow-up Using an ‘Early Discharge’ Kangaroo Care Policy in a Resource Poor Setting

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Summary

Aim: To describe the outcomes of low-birth-weight babies using an ‘early discharge’ Kangaroo care policy and to identify barriers to their follow-up.

Methods: Prospective descriptive study of all 272 babies admitted to a Kangaroo Care Ward in Malawi from November 2003 to May 2004. Infants were discharged to outpatient care once weighing over 1300 g and gaining weight. Follow-up was carried out until 2500 g.

Results: Infants [201 of 272 (73.9%)] reached a weight >2500 g; 46 out of 272 (16.9%) died; outcome was unknown in 25 of 272 (9.2%). Outpatient mortality was higher amongst discharges weighing under 1500 g [RR = 2.41(1.25–4.63) P = 0.01]. Discharge below birth weight did not affect mortality [RR = 0.77(0.40–1.46) P = 0.42]. Barriers identified to seeking healthcare post-discharge included transport problems and late recognition of illness.

Conclusions: Early discharge is safe and feasible, but issues regarding access to healthcare need to be addressed. Future research is needed to determine how best high mortality can be reduced in specific subgroups: notably infants <1500 g.

Key words: Kangaroo mother care, less-developed countries, low-birth-weight infant.

Introduction

Kangaroo Care is early, prolonged and continuous skin-to-skin contact between a mother and her low-birth weight (<2500 g) infant, both in hospital and later continued in the community [1–4]. Its widespread use over the last 10 years in resource poor settings has enabled discharge of infants from hospital to community-based Kangaroo Care while they are still at relatively low weights [5]. Facility-based studies have argued that such early discharge policies are safe and effective [6]. However, there is no universal agreement on a ‘safe’ weight at discharge or on an optimal follow-up regime.

Reported mortality rates after hospital discharge in low-birth-weight ‘Kangaroo’ babies vary from 3% in Columbia [6] to 26.6% in Zimbabwe [5]. The majority of the deaths occur in the first 2 months after hospital discharge [5, 6]. Partly to address concerns associated with early hospital discharge, the initial programmes from middle-income countries like Columbia adopted ‘Ambulatory Kangaroo Care’. In this model, babies were followed up daily as outpatients until they gained weight. Intervals between visits increased as the baby’s weight increased. Such a model allows close clinical monitoring, but is too resource-intensive to be sustained in many settings [7–9].

The current WHO guidance (2003) on Kangaroo Care [10] attempts to balance a perceived idea of frequent health service contact with the need for a more practical and achievable schedule. The guidelines recommend twice weekly follow-up until 37 weeks corrected gestation and then weekly until term. It is suggested that prior to hospital discharge a low-birth-weight baby must ‘gain at least 15 g·kg⁻¹ per day for at least 3 days, be exclusively or predominantly breastfed, have a stable temperature in Kangaroo position and mother must be able to comply with follow-up visits’. Even this more flexible

Acknowledgements

We gratefully acknowledge the patients and staff of Kangaroo Care Ward and Queen Elizabeth Hospital, Malawi, without whom this study would not have been possible. In particular, we thank Mrs F. Chabwera and Mrs B. Levi who led the field visits.

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doi:10.1093/tropej/fmn116 Advance Access Published on 10 February 2009
approach is too resource- and time-intensive for many settings.

Better evidence is needed to choose effective, safe and practical but manageable approaches to care. We audited the results of a protocol with both earlier discharge and less-frequent follow-up visits. We also explored barriers to follow-up that may adversely affect this less-intensive, less-medical approach.

Methods

Setting
The study was undertaken at the Queen Elizabeth Central Hospital (QECH), Blantyre, Malawi. This is both the tertiary government referral unit for the Southern region and a district hospital for Blantyre city and its surrounds. All care is free at the point of delivery. In QECH, there are 10,700 deliveries per year (Metaferia unpublished data, 2004), many of which are designated high risk. The nursery admits 3500 neonates per year (Blencowe unpublished data, 2007). Babies with a birth weight of <2000 g born in Blantyre District are admitted routinely. These are approximately half of all admissions. The nursery offers neonatal special care, but no intensive care.

A Kangaroo Care inpatient ward was opened in November 2003. It has nine beds and is run by patient attendants (non-specialist, non-clinical staff with high-school qualifications and on-the-job training) who are overseen by a doctor. Mothers carry out all infant care under the support and supervision of the patient attendants.

Malawi is a resource poor country with a GDP of $720 per capita; 20.8% of the population live on less than $1 a day [11]. Nearly half (41.6%) of the adult population are not in paid employment and rely on subsistence farming [12]. All the patients rely on public transport, usually minibuses. In this context of low incomes, local transport costs are high (around $0.13/km). Returning to the central hospital, especially for those living far away is expensive. For those in more rural areas, a walk of up to 3 hours may be necessary just to reach the nearest road to get a minibus.

Patients
Profile and outcomes for all babies admitted to Kangaroo Ward were audited over a 6-month period from November 2003 to May 2004.

All babies with a weight of <2000 g were eligible for admission to the Kangaroo ward after initial stabilization in the nursery. Twins of eligible babies were also admitted. There was no minimum weight restriction for admission.

Discharge policy
Before the Kangaroo ward was opened, staff and mothers discussed the feasibility of returning to a Kangaroo follow-up clinic at QECH after early discharge. Past experience made us question the ability to implement the full WHO discharge guidelines, as these criteria are usually met only when a baby is over 1500 g. Previously at QECH, preterm or low-birth-weight babies were discharged when they reached a weight of 1500 g. This had contributed to significant overcrowding in the nursery. In 2003, other Malawian hospitals with Kangaroo Care wards were discharging babies at 1300 g.

A local discharge policy was implemented which differed in several key aspects from existing WHO international guidelines. These were that before discharge the baby must

- have gained any weight for 3 days (g/kg/day was found to be too difficult for the patient attendants to calculate. In contrast, absolute weight gain was easily understood and followed by patient attendants discharging the babies).
- be over 1300 g.

Criteria in common with WHO guidelines were as follows:

- maintain a stable temperature (36.0–37.5°C) in Kangaroo position;
- be able to breast feed or cup feed expressed breast milk well.

The mothers were advised to continue Kangaroo position 24 hours a day at home until the baby was at least 2500 g.

Follow-up and defaulters
For follow-up, a less-intensive schedule was adopted. Babies were offered a fortnightly appointment until they weighed 2000 g and then a three-weekly appointment until they reached a weight of 2500 g when they were discharged from Kangaroo Care follow-up [13].

To assess the effectiveness and safety of this modified protocol, all patients were followed up. Defaulting patients were seen at a home visit.

Ethical considerations
This is an audit of routine departmental practice and as such was waived from formal ethical approval.

Data collection and analysis
Patient data was initially entered in routine ward registers by the admitting patient attendant. Discharge information, follow-up visits, dates and weights were entered in the same register. Subsequently, anonymized data was entered and analysed using Epi Info 3.4.3 (CDC, Atlanta, USA).

Results
In a 6-month period (November 2003–May 2004), 272 babies were admitted to the Kangaroo ward.
The mean weight on admission was 1505 g (range 760–2430 g) and on discharge was 1598 g (range 750–2560 g). Among survivors, the mean length of stay to discharge on the Kangaroo ward was 6.3 days (range 0–41 days). The mean overall length of stay in hospital was 11.9 days (range 2–55 days) and 143 of 272 (52.6%) were discharged home weighing less than their birth weight. A third (92 of 272) were discharged home with a weight of less than 1500 g.

Overall, 247 of 272 (90.8%) babies were followed up to 2500 g. Half (139 of 272) successfully completed outpatient follow-up. A further 58 of 272 (21.3%) had defaulted from follow-up but were well on home visit. Four had defaulted from follow-up, but later were admitted to hospital weighing >2500 g. A total of 46 of 272 (16.9%) died: 14 of 272 (5.1%) prior to discharge and 32 of 272 (11.8%) as outpatients. Final outcomes were unknown for 25 of 272 (9.2%), including 2 absconders and 23 who could not be traced at home follow-up (Fig. 1).

Discharging babies home who had not regained birth weight did not affect early outcomes RR = 0.77 (0.40–1.46) \( P = 0.42 \). Babies discharged home with a weight <1500 g had a higher early mortality RR = 2.41 (1.25–4.63) \( P = 0.01 \) (Table 1).

Mean time to outpatient death was 31.2 days post discharge (range 2–82; median = 29 days). This did not differ significantly amongst those discharged at <1500 g [31.6 days, range 4–82: median = 16.0 days] and \( \geq 1500 \) g (30.8 days, range 2–55: median = 31.0 days).

![Fig. 1. Flowchart of outcome of infants admitted to Kangaroo Ward](image-url)
Fifty-four percent (139 of 256) of those discharged home completed follow-up at hospital. They attended clinic a mean of 2.7 (range 1–6) times and were followed up for a mean of 46.7 (range 10–105) days.

Six percent (16 of 256) required readmission to hospital during the follow-up period. Of 256, 32 (12.5%) died during the follow-up period; 24 at home and 8 in hospital. Of the 32, 11 (34.3%) had sought health care prior to death (five at local health centre, six at Kangaroo ward). A face-to-face interview was carried out with the mother or guardian of the child to explore reasons for not seeking healthcare and the events around the baby's death.

In 9 of 21 (42.9%) deaths where care was not sought prior to death, the mother had not appreciated the severity of the child’s illness. Four of these mothers had thought the illness to have been mild. Five had not noticed any signs of illness prior to death. In 4 of 21 (19.0%) cases, the mother said that though she knew that her baby was sick, she was unwilling to leave the house at night to seek health care when transport is rarely available. Other transport issues ‘the health centre is too far’ and ‘no money for transport’ were each given once. In 6 of 21 (28.6%) cases, the mother was unwilling to discuss the reasons (Table 2).

Sixteen babies were known to have died during the follow-up period (deaths occurred in hospital or were reported to the ward by the mother). Four babies presented to QECH after the follow-up period. Successful home visits were carried out for 74 of the remaining 97 who failed to complete clinic follow-up. Nearly half (34 of 74) (46.5%) lived in a Blantyre township, 20 (27.0%) lived in rural Blantyre District and 20 (27.1%) in another rural area. Thirty-four of 74 (45.9%) lived in a grass-roofed house and 40 (54.0%) in an iron-roofed house.

Of the 78 non-attenders, 28 (37.8%) of mothers said that they lacked money for transport, a further 16 babies had died (21.6%) and 8 (10.8%) mothers had gone back to their home village. Six (8.1%) thought that attending the clinic was not important and preferred to use their money for other priorities. Five (6.8%) mothers were too sick of whom three subsequently died (Table 3).

Discussion

Nearly three-quarters of babies admitted to the Kangaroo Ward survived to 2500 g.

Mortality was higher amongst those discharged home at a weight <1500 g compared to those discharged home weighing ≥1500 g. This may be explained by the vulnerability of very low-birthweight babies. Further studies are required to assess whether the outcome of these very low-birth-weight babies might be improved by keeping them in hospital for longer and to define the best discharge practice for them. It is notable that mean time after discharge to death of the babies <1500 g did not differ significantly from those of larger babies and

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**Table 1**

<table>
<thead>
<tr>
<th>Discharge weight</th>
<th>Number known to have died (%)</th>
<th>Number known to have survived (%)</th>
<th>Relative risk (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1500 g</td>
<td>19/92 (20.7)</td>
<td>69/92 (75.0)</td>
<td>2.41 (1.25–4.63)</td>
<td>0.01</td>
</tr>
<tr>
<td>≥1500 g</td>
<td>13/164 (7.9)</td>
<td>132/164 (80.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;Birth weight</td>
<td>16/143 (11.2)</td>
<td>114/143 (79.7)</td>
<td>0.77 (0.40–1.46)</td>
<td>0.42</td>
</tr>
<tr>
<td>≥Birth weight</td>
<td>16/110 (14.5)</td>
<td>84/110 (76.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Table 2**

<table>
<thead>
<tr>
<th>Reason given for not seeking healthcare prior to death</th>
<th>Number of cases (%) n=21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby dead or moribund</td>
<td>5 (23.8)</td>
</tr>
<tr>
<td>Night time</td>
<td>4 (19.0)</td>
</tr>
<tr>
<td>Health facility is too far</td>
<td>1 (4.8)</td>
</tr>
<tr>
<td>No money for transport</td>
<td>1 (4.8)</td>
</tr>
<tr>
<td>Did not realize how sick the baby was</td>
<td>4 (19.0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>6 (28.6)</td>
</tr>
</tbody>
</table>

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**Table 3**

<table>
<thead>
<tr>
<th>Reason given for not attending follow up clinic</th>
<th>Number of cases (%) n=74</th>
</tr>
</thead>
<tbody>
<tr>
<td>No money for transport</td>
<td>28 (37.8)</td>
</tr>
<tr>
<td>Baby had died</td>
<td>16 (21.6)</td>
</tr>
<tr>
<td>Mother had gone to the village</td>
<td>8 (10.8)</td>
</tr>
<tr>
<td>Was ‘not important’ to attend</td>
<td>6 (8.1)</td>
</tr>
<tr>
<td>Moved out of area</td>
<td>5 (6.8)</td>
</tr>
<tr>
<td>Mother sick</td>
<td>5 (6.8)</td>
</tr>
<tr>
<td>No follow-up date given</td>
<td>3 (4.1)</td>
</tr>
<tr>
<td>Baby was already ‘big’</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Not sure</td>
<td>1 (1.4)</td>
</tr>
</tbody>
</table>

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Three mothers died.
was 31 days. ‘Longer stay’ policies would therefore have important resource and ward capacity implications.

There was no increase in outpatient mortality in those infants discharged early, before regaining birth weight. This contrasts with some other studies (de Graft-Johnson unpublished data, 2004). We postulate that regaining birth weight does not per se place an infant in a lower risk category. It is only a marker of wellbeing, which can be indicated equally well by good clinical judgement combined with starting to gain weight.

Barriers do exist to accessing healthcare in resource poor settings. This may be critical in low-birth-weight infants, who are vulnerable to infections and likely to deteriorate rapidly. In this study, only about a third (34.3%) of mothers whose babies died contacted the health service before the death. In 9 of 21 (42.9%) cases, the mother did not recognize danger signs in her baby prior to death. The outcome in these cases may have been improved with maternal education. Even in those cases where the mother recognized ‘danger signs’ in her baby and presented to her nearest health centre, she did not always receive appropriate care. Although a formal verbal autopsy was not carried out, interviewing the mother regarding the events around the baby’s death suggested infective processes (most commonly pneumonia and meningitis) or sudden infant death in all cases. This would be consistent with reports from other resource poor countries that show that over 80% of neonatal deaths after day 7 are due to severe infections [14].

Compliance with this reduced follow-up schedule was low—69.2% of known survivors attended all follow-up appointments. Transport factors were the most commonly cited barrier to attending the hospital.

To overcome these barriers, we would empower staff at local health centres to follow-up Kangaroo babies for the vulnerable 2 months after discharge. Transport would cost less for the mothers and at the local health centre Kangaroo Care follow-up could be combined with immunizations. Health Surveillance Assistants could follow-up babies in their homes if they fail to attend clinic. Additional training for the staff of the health centre in newborn, infant and Kangaroo Care would be necessary.

This setting is similar to many across Sub-Saharan Africa and other resource poor regions. Many hospitals have adopted Kangaroo Care however there is a paucity of literature available on the impact of early discharge and optimum follow-up support of Kangaroo mothers after discharge. This study suggests that early discharge is safe and feasible, but access to healthcare needs to be addressed. Systematic roll out of Kangaroo Care to all levels of health facilities may reduce these barriers. This could be an opportunity to improve care for all neonates in the community and assist countries in reaching MDG 4 by reducing neonatal mortality.

References