



## Research paper

Perception of kangaroo care in German neonatology—A nationwide survey<sup>☆</sup>Michael Thiel<sup>a,d,\*</sup>, Alfred Längler<sup>b,d</sup>, Markus Rose<sup>c</sup>, Thomas Ostermann<sup>d</sup><sup>a</sup> Department of Paediatrics and Adolescent's Health, Sana-Hospital Remscheid GmbH, 42859 Remscheid, Germany<sup>b</sup> Department of Paediatrics, Community Hospital Herdecke, 58313 Herdecke, Germany<sup>c</sup> Department of Paediatrics and Adolescent's Health, Sana-Hospital Offenbach, 63069 Offenbach, Germany<sup>d</sup> Chair of Research Methodology and Statistics in Psychology, Witten/Herdecke University, Alfred-Herrhausen-Str. 50, 58448 Witten, Germany

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## ABSTRACT

**Introduction:** Kangaroo care (KC) involves the infant being placed on its mother's or father's bare chest. It is thought to have a positive impact on infants. Data on outcomes are scarce.**Methods:** A semi-structured questionnaire inquiring about the use and perception of kangaroo care was sent to the heads of all neonatology departments and children's hospitals with a neonatal ward in Germany.**Results:** The response rate was 51%. Among responders, 98% used KC. Performance instructions for the staff were provided in 25%, 41% had hygiene regulations for parents. Special chairs were provided in 89%. 85% used additional music, 20% used light therapy, and 5% aromatherapy. Security precautions existed in 31%, 26% monitored O<sub>2</sub>/CO<sub>2</sub> transcutaneously, 18% restrict the number of kangarooing infants in parallel, and 24% demanded a physician on the ward at the time of KC. A minimum gestational age was required in 91%; 86% required a minimum postnatal age and 88% a minimum body weight. In 21%, precautions were taken before using KC. Among these, a normal cranial ultrasound was the most common (45%) requirement.**Conclusions:** This is the first survey on the use, perception, and exploration of outcome of kangaroo care by medical staff in Germany. Although the survey reflect opinions rather than facts, the results show that the use of KC correlates with the level of neonatal care and experience of the staff. The study provides detailed information on the perception of the conditions and limitations of KC and offers a useful basis for further research.

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## 1. Introduction

In addition to standard neonatal intensive care, there are several complementary strategies that have the potential to improve the clinical outcomes and to support bonding between infant and carer. Among these methods, kangaroo care (KC) is particularly common in neonatal care. However, while several aspects like its impact on analgesics or oxygen need have been investigated, data on the real-life performance of KC are scarce.

The term “kangaroo care” is often used interchangeably with the terms “kangaroo mother care” (KMC) and “skin-to-skin care” although KMC is the bigger concept with skin-to-skin care 24 h a day together with early discharge and preferably exclusive

breastfeeding while “skin-to-skin care” and “kangaroo care” is more a term for when the infant is cared for skin-to-skin regardless of whether this is for half an hour or longer periods of time.

Kangaroo care is a widespread method in neonatology in which the infant (wearing only a diaper) is placed on its mother's or father's bare chest in prone position. Due to its complementary, integrative approach it is felt that KC is relevant to integrative medicine, especially since it is often accompanied with other complementary therapies such as, for instance music therapy, aromatherapy or other adjunct treatment.

The method was first described in the 1970s by Rey and Martinez [1], two pediatricians from Columbia. It is applied in order to achieve a lower morbidity of underweight neonates by allowing an earlier discharge from the hospital. This is essential in low-hygiene settings or in environments lacking incubators and other crucial resources. The main definitions of kangaroo care by the World Health Organization (WHO) are “The care of preterm infants carried skin-to-skin with the mother” and “Early, continuous

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and prolonged skin-to-skin contact between the mother and the baby, ideally exclusive breastfeeding, initiation in hospital and continuation at home and the aim to provide small babies with the opportunity to be discharged early" [2].

In 2003, the WHO declared this method a suitable alternative to standard incubator care. However, in the same year, a Cochrane Review discouraged a routine use due to insufficient evidence in low birth weight infants [3]. Although a more recent Cochrane Review from 2011 concludes "that there is sufficient evidence to recommend the use of KMC in stabilized LBW infants" [4]. In 2014, however, the meta-analysis changed the recommendations at least in resource-limited settings [5]. Although its practical implications are still uncertain, a recent meta-analysis showed a reduction of overall mortality [6]. Other systematic reviews concluded that kangaroo care can potentially reduce mild to moderate pain in neonates [7,8,9,10,11,12]. KC is also believed to regulate the infant's heart rate, breathing and temperature [13], improve head circumference growth and weight gain [14,15,16], stabilize their organ function and self-regulation abilities [10,17], experience less pain and less crying [10], facilitate better sleep patterns [18,19], avoid infections [6], take advantage of improved nutrition from mothers' increase in breast milk production and be more willing to breastfeed [19,20,21,22].

Thus, kangaroo care has developed from "neonatal care for the poor" into an almost standard practice that is commonly applied. Recent research on skin-to-skin care mainly focuses on three main topics:

1. *Emotional aspects*: improving parent–child contact and thus partially regaining the situation with a healthy full-term baby [23,24].
2. *Scientific aspects*: fostering bonding [25,19] and other aspects of mother/father–infant interactions [26,27,28], positive influence on breastfeeding [20,21,22], reduction of the risk of mortality, nosocomial infection/sepsis, hypothermia, and length of hospital stay [6].
3. *Clinical effects on vital parameters*, e.g. oxygen saturation and cardio-respiratory stability [25,26,27], pain scores [7,8,9,10,11,12], or neurological development [14,15,16].

Generally, we must distinguish between *continuous KC* and *intermittent KC*. While in non-industrialized countries, continuous kangaroo care is commonly recommended [28,29], there is only limited data on intermittent KC in industrial countries (namely in Germany). It is believed that examining the practical aspects of kangaroo care as this form of care forms a valuable part of an important repertory of increasingly sensitive neonatal care. Thus, an exploring of the practical aspects of performing kangaroo care in German neonatal units was the objective of the present survey. In the following sections, we present data on setting, structure, and performance of KC in Germany, as well as additional observations reported by the medical staff.

## 2. Material and methods

### 2.1. Development of the questionnaire

Due to absence of pre-existing survey instruments tailored toward our research question, our study group developed a semi-structured questionnaire which was based on staff interviews of a number of NICUs (neonatal intensive care unit). Feasibility testing included several re-evaluations by in-house and external researchers and neonatal staff [30].

The questionnaire was divided into five main topics:

- 1) Settings and limitations of practicing KC in the NICU;

- 2) Perceived effects of KC;
- 3) Perceived adverse effects of KC;
- 4) Parental attitudes towards KC;
- 5) Basic characteristics of the NICU (e.g. hospital status, average number of treated neonates per year, average number of neonates <1500 g birth weight per year, average percentage of mechanical ventilation per year, average percentage of non-invasive ventilation per year).

For part 1 of the questionnaire "Settings and limitations of practicing KC in the NICU" our main research question was "Which different types of approaches of kangarooing are there in German pediatric clinics?". Specifically, it was inquired whether kangarooing was offered, if so for which duration, whether special chairs were available and whether any additional complementary therapies were also provided. Furthermore, participants were asked whether they could identify any limitations and medical requirements that needed to be met for the application of kangarooing.

Inquiries in part 2 were specifically tailored toward observed effects in outcomes during and after kangarooing (oxygen demand, bradycardic events, apnea, SaO<sub>2</sub> fluctuation).

Part 3 asked about specific contraindications which would prevent kangarooing from being offered at the unit (e.g. lung/bronchial conditions, temperature instability, pathological diagnosis of the skull after sonography, hemodynamic relevant Patent ductus arteriosus).

Part 4 inquired specifically about the occurrence of adverse events during kangarooing (oxygen demand, bradycardic events, apnea, SaO<sub>2</sub> fluctuation, hypothermia, extubation, atelectasis, suspected infection).

Finally, part 5 of the instrument asked for the type of feedback received from parents, whether kangarooing was ever rejected and if so whether fear could be a contributing factor to the decision of rejecting.

There was also a general, non-kangaroo-related part 6 of the questionnaire which enquired about the estimated number of treated infants at the unit, children below 1500 mg and an estimate of patients receiving invasive/non-invasive respiratory ventilation.

Participants were faced with either having to respond to a yes/no question, rate the severity on a scale 1–3/1–4 or answer an open-ended question in their own words. For some of the parts a set of responses were provided from which to chose from (for instance, limits on application of KC, for instance due to gestation age, weight and age).

### 2.2. Participants

The final version was distributed to the heads of all German neonatal wards, with an e-mail reminder after six weeks.

### 2.3. Statistical Analysis

Questions asking for opinions were mostly dichotomous (yes/no) or five-point Likert scaled (from "total agreement" to "total disagreement"). Space for open answers or comments was provided after each section and at the end of the questionnaire. The statistical analysis was performed using SPSS for Windows<sup>®</sup> version 19.0 (SPSS Inc., Chicago, Illinois/USA). We focused on descriptive analysis. Facing the German system of different levels of neonatal care (*Level 1*: no lower limit for birth weight or gestational age or any prenatal risk factor; *Level 2*: infants of more than 1250 g; *Level 3*: late preterms; *Level 4*: obstetrical units with basic neonatal care), we performed univariate statistical analyses between sub-groups created from the structural aspects "*hospital status (level of neonatal care)*", "*average number of neonates treated*

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