

REGULAR ARTICLE

Skin-to-skin care in neonatal intensive care units in the Nordic countries: a survey of attitudes and practices

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ABSTRACT

Aim: To investigate the application of skin-to-skin care (SSC) in the Nordic countries, the existence of guidelines for SSC and the attitudes of neonatal staff towards SSC.

Methods: One questionnaire was distributed at unit level and one at staff level in all Nordic neonatal intensive care units (n = 109).

Results: The unit questionnaire was answered by 95 (87%) units and the staff questionnaire by 1446 staff members (72%). All units offered SSC to various degrees, but guidelines only existed at 47% of them. Units in Denmark, Norway and Sweden seemed to use SSC earlier, longer and in more medically complicated situations than units in Finland and Iceland. Seventy-seven per cent of the units had private rooms where parents and infants could stay together, still the physical environment of the units limited the use of SSC. Medical risks were considered the main barrier for further implementation of SSC, while general development and early interaction were the most frequently mentioned benefits.

Conclusion: Skin-to-skin care is implemented in all Nordic neonatal units, but offered to various degrees, to various populations and to varying extents. Danish, Norwegian and Swedish units are offering SSC more extensively than units in Finland and Iceland.

BACKGROUND

There has been an emerging interest in, and research about, skin-to-skin care (SSC) for both preterm and full-term infants and their parents over the last decade. SSC is defined as the infant, dressed only in a diaper and maybe a cap, lying on the parents' bare chest. SSC may be provided around the clock or intermittently in limited sessions and is one component of kangaroo mother care (KMC) which by definition also includes exclusive breastfeeding, early discharge and proper follow-up (1).

Skin-to-skin care has several positive effects on both the infant and the parents. Meta-analyses suggest that morbidity and mortality can be reduced in resource-limited settings (2). In affluent, high-tech settings, many studies have found that SSC has the same or better outcomes as traditional neonatal care when looking at, for example, breastfeeding, temperature control, heart rate, breathing activity, oxygen saturation and metabolism (3). Skin-to-skin care has also been reported to reduce signs of pain during blood sampling (4) and intramuscular injections (5). Positive effects have also been shown on the parenting process (6). Finally, several qualitative studies on parental experiences of SSC, as

shown in a meta-study, report positive experiences such as being important for the infant's recovery and well-being, but also a fear of hurting the infant and ambivalence towards siblings and the rest of the family (7).

Skin-to-skin care has been implemented to various degrees in neonatal care all over the world, but little is known about to what extent and for which populations. In a study from the USA in 2002, 40% of level 2 and 3 neonatal units had guidelines for KC holding (8). Other studies on the implementation of SSC have pointed out the

Key notes

- Skin-to-skin care was used in all Nordic neonatal units, but to various extents and for various populations.
- Guidelines only existed at half of the units.
- One-third of the units restricted parental presence and one-fourth of the units did not offer the possibility for parents and infants to stay together in a private room at the unit.

importance of management and collegial support and of a structured implementation process (9,10).

The National Association of Neonatal Nurses in the USA has published guidelines for the implementation of kangaroo care for preterm infants of 30 or more weeks postmenstrual age (3). There are also evidence-based guidelines from Colombia (11), and recommendations on a superior, nondetailed level (1), but to our knowledge, no common Nordic or national guidelines for the implementation of SSC in clinical practice exist in the Nordic countries.

It is important to investigate to what extent this evidence-based practice is provided to preterm infants and their parents. This knowledge will facilitate further implementation of SSC in Nordic neonatal care.

The objectives of this study were to investigate the level of application of SSC in the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) and to examine the attitudes of neonatal intensive care unit (NICU) staff regarding SSC.

- 1 To what extent and in which situations is SSC provided in neonatal intensive care in the Nordic countries?
- 2 Are there existing guidelines for the use of SSC in neonatal care?
- 3 What are the staff's attitudes towards SSC and what conditions do they consider facilitating or hindering the implementation of SSC?

METHODS

In this descriptive and comparative study, questionnaires were sent to all units providing neonatal care in the Nordic countries. Data were collected on both unit and individual staff levels. In each country, the study protocol was approved by all participating hospitals according to their regulations. In addition, the study protocol received favourable ethical opinions from the ethics committees in countries where this was required: Finland, Iceland, Norway and Sweden.

All neonatal units in Denmark ($n = 20$), Finland ($n = 28$), Iceland ($n = 1$), Norway ($n = 19$) and Sweden ($n = 41$) were invited to participate. Maternity units were not included in the survey, even though they might provide some special newborn care like phototherapy.

Addresses to the units were collected from national registers. The head nurse at each unit received a unit questionnaire and a package of staff questionnaires together with information about the study. To achieve a good variation and an unbiased sample of the staff, all healthcare personnel (assistant nurses, nurses and physicians) beginning their shift during a given 24-h period were asked to participate. It was up to the head nurse to decide in which 24-h period to hand out the questionnaire, within a given week in September 2010. After 2 weeks, a reminder was sent to the units that had not replied. Each national investigator collected the forms before data compilation and analysis.

The units were classified in accordance with the levels of care described by the American Academy of Pediatrics, ranging from level II 'Speciality neonatal care', where infants born at more than 32 weeks and weighing more than 1500 g are cared for, to level IIIc 'Subspeciality neonatal care', where infants born below 28 weeks and weighing <1000 g are cared for and where the institution also can provide ECMO and surgical repair of serious congenital cardiac malformations (12).

The questionnaires were constructed to facilitate comparison with former and future investigations. They were constructed in the English language by the research group and afterwards translated to the local languages, followed by a back translation. The content validity of the translated versions of the questionnaires was established through cognitive debriefing with selected small groups of health care staff with neonatal experience (13).

The head nurses were asked to fill in a unit questionnaire comprising demographic information (number of beds, staffing, etc.), questions concerning which infants could receive SSC and to what extent, and also what factors would prevent or promote SSC in the unit. The head nurses were also asked to attach any existing guidelines about SSC/KMC to the reply form.

The selected subset of staff were asked to reply to a staff questionnaire regarding their attitudes towards SSC, and what conditions they considered facilitating or hindering the use of SSC. The staff member questionnaire included a list of 23 possible barriers for the use of SSC, modified from the Kangaroo Care Questionnaire (KCQ) (10), with permission. Each factor was to be rated on a scale ranging from 1, 'not influential at all', to 5, 'very influential', as a barrier for implementation at their own unit. Staff members were also asked to indicate for how long a stable premature infant, cared for in an incubator or a cot, respectively, could receive SSC in their unit. The categories were <1, 1–3, 3–6, 6–8 h and >8 h. The staff questionnaire ended with an open question with the opportunity to further comment on SSC.

Data were entered into an MS Excel (Microsoft Corp., Richmond, WA, USA) spreadsheet and analysed with SPSS version 15 (IBM Corp., Armonk, NY, USA). A series of twelve questions where the respondents rated how comfortable they felt about providing SSC in different care situations, from 1, 'very uncomfortable', to 5, 'very comfortable', were combined into a 'comfort index' by calculating the mean score for all 12 situations. The underlying assumption for this index is that a lower mean value indicates a higher reluctance towards providing SSC. To present and analyse differences between countries and between units with different levels of care, we used mean, median and one-way ANOVA with Scheffe's *post hoc* test for data on the interval level. For ordinal data, we used median, min-max range and the Kruskal–Wallis test as well as the chi-square test for group comparisons. As Iceland only had one neonatal unit, some demographic data and results are presented excluding the Icelandic numbers, or with the Icelandic data included in the total.

RESULTS

We identified 109 units providing neonatal care in the Nordic countries, of which 95 (87%) responded to the unit questionnaire. A total of 1999 staff questionnaires were distributed at those units and 1446 (72%) were returned. The response rate in the different countries varied from 56% in Norway to 87% in Finland (Table 1).

Table 1 shows that the responding staff members in Sweden were older and had longer neonatal experience than in the other countries. Sweden also had a larger proportion of assisting nurses than the other countries.

Although all units provided infants and parents with the opportunity for SSC, only 47% had guidelines for the use of SSC (Table 2). Guidelines were more common in the more advanced units; 58% of level III units had guidelines compared with only 19% of the level II units ($p < 0.005$). Approximately half of all units had written information for the parents (Table 2). Written information was also more common in the more advanced units (54% of level III versus 38% of level II units), but this difference was not significant.

A majority of the units had private rooms where the infants could stay together with their parents (Table 2), ranging from two to seven rooms per unit. Twenty-nine per cent of the units reported that they had periods during the day with restrictions in parental presence in the unit, most

commonly 'during rounds', followed by 'during nights in the intensive care room' and 'while admitting another baby'. One-third of the units allowed parents to be present in the intensive care room 24 h a day (Table 2).

A majority of the units in Denmark, Norway and Sweden strived to provide the first SSC immediately after birth, while most units in Finland and Iceland reported doing so at the first parental visit in the neonatal unit (Table 2). More level III units (48%) than level II units (31%) provided SSC 'immediately after birth', but the difference was not significant ($p = 0.165$).

A medically stable infant in Denmark, Norway and Sweden most commonly received SSC 3–6 h per day when cared for in an incubator and <3 h per day when cared for in a cot. In Finland, SSC was most commonly given <3 h per day, regardless of whether the infant was cared for in an incubator or a cot (Fig. S1a,b). Most respondents reported longer SSC time for infants cared for in incubators than for those cared for in cots ($p < 0.0001$). This was also mentioned by many of the staff members in the open questions where one of the nurses expressed: '*... parents stop giving SSC when the infant is put in a cot and get clothes on*'. This trend was reversed in Iceland where SSC time increased when infants were transferred from incubator to cot care. Only 1% of infants in incubators and 4% of infants in cots received SSC more than 8 h per day.

Table 1 Characteristics of responding units and their responding staff

	Denmark 18/ 20 units	Finland 27/ 28 units	Iceland 1/1 unit	Norway 19/19 units	Sweden 30/41 units	Total 95/109 units
Responding staff, n	346	333	20	322	425	1 446
Third-level units (IIIa-c), n (%)	16 (89)	12 (44)	1 (100)	16 (84)	23 (74)	68 (72)
Number of beds per unit, MD (min–max)	16.5 (6–36)	12 (2–27)	22 (actual number)	13 (6–32)	12.5 (5–30)	13 (2–36)
Number of intensive care beds per unit, MD (min–max)	9 (2–22)	2.5 (0–14)	10 (actual number)	4 (0–8)	5 (2–18)	6 (0–22)
Admission of newborn infants/year per unit, MD (min–max)	487 (50–933)	326 (27–1600)	425 (actual number)	355 (100–770)	302 (39–795)	356 (27–1600)
Minimum staffing during daytime Monday to Friday, MD (min–max)						
Assistant nurses	1 (0.5–2)	1.5 (0.5–4)	(actual numbers) 1	1 (0–4)	3 (1–9)	1 (0–9)
Nurses	5 (2–18)	3.5 (0.5–12)	5	7 (0–22)	3 (1–7)	4 (0–22)
Physicians	1.8 (1–7.5)	1.2 (1–4)	3	2 (0–5)	2 (1–5)	2 (0–7.5)
Nurse staffing: admissions per daytime nursing staff, MD (min–max)	72.9 (25–92.2)	50.8 (6.8–92.9)	70.5 (actual number)	46.9 (29.6–92)	51.4 (9.8–74.9)	51.7 (6.8–92.9)
Respondents' age, mean years (SD)	39.5 (9.4)	40.8 (10.9)	40.8 (11.8)	40.4 (10.3)	44.3 (10.8)	41.2 (10.7)
Respondents with >5-year neonatal experience, n (%)	194 (57)	224 (67)	9 (45)	218 (68)	298 (70)	943 (66)
Profession of respondents, asst. nurse/nurse/physician, %†	1/83/12	13/76/1	5/65/30	5/80/13	43/49/8	17/71/10
Female sex, n (%)	327 (95)	327 (98)	15 (75)	300 (93)	383 (90)	1 352 (93)

*Nursing staff = nurses + assistant nurses.

†'Other' professions not included; MD = median.

Table 2 Policies and practices about skin-to-skin care in the responding units

	Denmark 18 units	Finland 27 units	Iceland 1 unit	Norway 19 units	Sweden 30 units	Total 95 units
Providing skin-to-skin care (SSC), n (%)	18 (100)	27 (100)	1 (100)	19 (100)	30 (100)	95 (100)
Guidelines about SSC, n (%)	9 (50)	7 (26)	1 (100)	9 (47)	19 (63)	45 (47)
Written information for parents about SSC, n (%)	7 (39)	11 (41)	0	9 (47)	20 (67)	47 (49)
Private rooms for the infant and parents, n (%)	14 (78)	13 (48)	1 (100)	16 (84)	29 (97)	73 (77)
Possible to stay next to intensive care bed 24 h/day, n (%)	12 (67)	4 (15)	0	6 (32)	12 (40)	34 (36)
Periods when the parents are not allowed to be at unit, n (%)	1 (6)	15 (56)	0	9 (47)	4 (13)	29 (30)
First SSC: immediately after birth/first time parents at neonatal unit/first 24 h, % *	44/33/11	11/41/26	0/100/0	58/26/5	60/20/10	42/31/14
Respondents encouraging SSC after discharge, n (%)	238 (69)	230 (69)	8 (40)	232 (72)	315 (74)	1024 (71)

*'Other time' not included.

Skin-to-skin care was mainly provided by the parents, but 32% (18–56%) of the units also allowed the infants' grandparents and 28% (18–50%) allowed the infants' siblings to provide SSC to the infant. A majority of the staff encouraged parents to continue SSC after discharge (Table 2).

Most staff members were comfortable or very comfortable with allowing SSC for infants during CPAP treatment (86% of the respondents) or phototherapy (71%), but fewer were comfortable with offering SSC to infants on high-frequency ventilation (16%) or with pleura drainage (12%). In Sweden, Denmark and Norway, a majority of the respondents reported being 'comfortable' or 'very comfortable' with allowing SSC to infants with umbilical venous (UVC) (71%) and arterial (UAC) (66%) catheters while most staff members in Finland (UVC 70%, UAC 75%) were 'somewhat uncomfortable' or 'very uncomfortable' in these situations. In Iceland, the most frequent answer was 'neither comfortable nor uncomfortable' (UVC 37%, UAC 42%).

Respondents in Denmark felt most comfortable with providing SSC, followed by Norway, Sweden, Iceland and Finland (Fig. S2). Some factors seemed to influence the comfort index as respondents with more than 5 years of experience had a significantly higher score on the comfort index (3.85, SD 0.77) compared with respondents with <2 years experience (3.60, SD 0.78), $p < 0.0001$. Assistant nurses (3.84, SD 0.75) and nurses (3.86, SD 0.77) had a higher score on the comfort index than physicians (3.36, SD 0.78), $p < 0.0001$, and respondents from level III units had a higher comfort index (3.82, SD 0.74) than those from level II units (3.52, SD 0.88), $p < 0.0001$.

The infants' medical stability was the main barrier to using SSC (92%) in most units, followed by 'other factors' (28%), where quite a few wrote 'critically ill infants', and gestational age (GA) (15%). No differences between the countries were found in this aspect. Table S3 shows how staff member respondents rated barriers to implementation at their own unit. The most frequently rated barriers to using SSC among staff in all countries concerned medical risk

factors and structural factors, mainly the physical environment of the units (Table S3). The physical surroundings in the units were frequently commented on. It seemed that this was a common issue in all the Nordic countries and explanations were, for example, 'The lack of space in the intensive care rooms makes it difficult to offer SSC' and 'it's crowded which means that the noise level gets too high for a premature infant'. There were no differences between the countries in reported possible barriers.

The majority of staff members (58%) reported the infant's general development as the primary benefit of SSC. Other possible benefits reported frequently were different psychosocial factors such as early interaction (51%), attachment (50%) and bonding (49%) (Fig. S3).

DISCUSSION

In this study, we found that all the participating neonatal units in the Nordic countries provided SSC for infants and their parents. An earlier survey from the USA concluded that 82% of the units provided SSC (10) while in a European study, three of eight participating countries still had units not offering SSC (1). The practice of Nordic NICUs is well in line with the current recommendation that SSC should be used both in low and middle resource countries and settings as well as in high-tech special care nurseries (1,14). The result of this study provides an excellent starting point for the implementation of SSC for longer periods and for younger and more ill infants in the Nordic countries.

The infants cared for in incubators were estimated by the staff to receive an average of 3–6 h of SSC per day, except in Finland and Iceland where the average was 1–3 h. This shorter duration was also evident in many NICUs in the remaining Nordic countries. It is recommended that SSC should last for at least one hour so that the infant can complete one sleep cycle (15). However, when considering all the immediate and long-term benefits of SSC compared with incubator care (1), it is questionable that these infants

spend the remaining 23 h of the day in a less optimal environment. Healthcare professionals should offer opportunities and support for parents to provide SSC to the extent they prefer and that the infant's medical condition allows (16). The infants cared for in cots received slightly less SSC than those cared for in incubators. This could be explained by the current NICU practices, which support older infants' wearing clothes and sleeping in cots while breastfeeding and holding provides the closeness. This practice of early physical separation from parents makes it plausible that the concept of continuous KMC (17) has not yet been recognized in the Nordic NICUs.

In addition to the duration of SCC, the time of first initiation of SCC is significant for the well-being of the family. SSC immediately after birth, as was the prevailing practice in Denmark, Norway and Sweden, is the recommended starting moment (1). It has been proven that parents suffered higher NICU-related stress when prevented from holding the infant within the first 24 h of birth (18). In NICU-admitted infants, the lack of early physical contact has been associated with behavioural and emotional problems at 5–6 years of age (19). In healthy infants, SSC is an optimal environment for the infant's stabilization and maternal bonding (20). The same holds true for infants requiring intensive care. In infants born at the gestational age (GA) of ≤ 27 weeks, the initiation should be based on individual medical assessment (1). The early separation, however, is not always based on infant condition (19), suggesting variation in caring practices. Although practices and maternal willingness set limits to early SSC, it is possible to increase the amount of early SSC in the intensive care of preterm infants by facilitating interventions (21).

As skin-to-skin contact has many benefits beside temperature control, 71% of the respondents recommend the parents to continue SSC after discharge, though we do not know if in general or for defined groups, for example, below a specified weight limit.

The fact that less than half of the responding units had guidelines for SSC indicates that the evidence-based practice can be better disseminated and implemented in many of the Nordic NICUs. Nurses in a study by Engler (10) also identified lack of guidelines and information as barriers to successful implementation of SSC. During the process of this study, a group of experts at the Seventh International Workshop on KMC proposed guiding principles for the application of KMC in a high-tech environment. They focus on the nonseparation of infants and their families, that preterm infants need SSC to promote maturation and that KMC should begin as soon as possible after birth and be used for as long as possible. They emphasize that there should be no visiting restrictions and that infants born at a GA of 27 weeks or less also can be cared for with SSC (1). To our knowledge, these are the first guidelines for SSC in an affluent setting, regardless of GA, and could serve as a basis for nationally and/or locally developed guidelines with a practical orientation for the implementation of SSC in the specific NICU context.

The adoption of clinical guidelines is one way of organizing changes in clinical practice. It is recommended that clinical guidelines are available in every NICU (1) and that they are based on current and valid evidence-based practice (22). Knowledge alone does not change the practice as nurses' perceptions of SSC strongly affect implementation (10). This was also seen in our study since the comfort index was lowest in Iceland and Finland where the SCC was offered for shorter periods. The reason for this must be further explored, but is likely to be dependent on different caring cultures and practices. A family-centred care approach has longer traditions in, for example, Sweden and Norway (23,24), whereas the first family-centred program in Finland was implemented from 2008 onwards (25).

The implementation of clinical guidelines can be viewed as a knowledge utilization strategy, turning research into practice (26). An implementation process is a complex interplay of evidence, clinical context and facilitation. Some of the issues that should be considered under these dimensions are clinical experience, patient preferences, leadership and culture (27). Our results support the earlier finding that nurses with longer neonatal experience are more comfortable with using SSC (10). In addition, working at level III units with infants requiring more intensive care seems to facilitate the implementation of SSC (10). This suggests that management and educational programs, especially in level II units, are important to increase the use of SSC. The technique to provide SSC is learned through training in the unit and through personal experience, and implementing SSC requires the involvement of management and support from colleagues (8,9).

The most frequently reported barriers to using SSC were the infants' stability and GA. No specific GA was reported from the Nordic units but Nyqvist et al. (1) suggest that decisions about SSC to infants born at a GA of 27 weeks or less should be based on individual medical assessments. The staff were reluctant to allow infants with high-tech invasive treatment like pleura drainage and high-frequency ventilation to receive SSC, which has also been reported in other studies (8,10). A difference was seen in infants with umbilical arterial and venous catheters; while the Swedish, Danish and Norwegian staff were comfortable allowing it, the respondents from Finland were uncomfortable, in line with the findings of Engler et al. (10). Some of these barriers are possible to overcome with training but infant safety must always be the primary criterion for the use of SSC.

To facilitate SSC, neonatal units must supply parents with sufficient spatial and organizational conditions (1). In the Nordic countries, a substantial amount of infants were not able to stay together with their parents in private rooms. Comparable to other European countries (28), 30% of the neonatal units also reported having periods when the parents were not allowed to be with their infant, which is actually in contradiction with the United Nations (29) convention on the rights of the child. The convention states that children have the right to have a parent or other guardian with them during the hospital stay, which also applies to the already vulnerable, preterm infants (30). The lack of

space for parents was quite clear. On the basis of the staff's perception that lack of space in the intensive care room is an important barrier to SSC, we recommend a development towards more family-oriented units, both in physical environment and in organization of the care.

The strength of our study is the high response rate as we were able to cover 87% of the neonatal units in the Nordic countries. A limitation is that the results are based on staff's self-reports and not on real-life observations and that some terms used in the questionnaire might have been understood differently by different respondents. However, the results gave us an extensive understanding of the current SSC practices with the barriers being the same but the implementation varying between the countries. By categorizing the duration of the given SSC, we lost more precise estimations on the duration and the wide span of the last category; >8 h reduced the precision and possibility to report continuous KMC. In addition, the questions related to barriers to provide SSC were found to be difficult to answer in Denmark and Norway.

CONCLUSION

All the participating neonatal units in the Nordic countries provided opportunities for SSC for infants and their parents. The NICU staff considered SSC beneficial to infant and family outcomes. The future challenge is to provide SSC for longer periods, up to continuous or nearly continuous SSC, and for younger and more ill infants and their families.

References

- Nyqvist K, Anderson G, Bergman N, Cattaneo A, Charpak N, Davanzo R, et al. State of the art and recommendations. Kangaroo mother care: application in a high-tech environment. *Acta Paediatr* 2010; 99: 812–9.
- Conde-Agudelo A, Belizán JM, Diaz-Rossello J. Kangaroo mother care to reduce morbidity and mortality in low birth-weight infants. *Cochrane Database Syst Rev* 2011; 3: Art. No.: CD002771. DOI: 10.1002/14651858.CD002771.pub2.
- Ludington-Hoe S, Morgan K, Aboulefetoh A. A Clinical Guideline for Implementation of Kangaroo Care With Preterm Infants of 30 or More Weeks' Postmenstrual Age. *Adv Neonatal Care* 2008; 8(Suppl. 3): S3–23.
- Johnston C, Filion F, Campbell-Yeo M, Goulet C, Bell L, McNaughton K, et al. Kangaroo mother care diminishes pain from heel lance in very preterm neonates: A crossover trial. *BMC Pediatrics* 2008; 8: doi:10.1186/1471-2431-8-13.
- Kashaninia Z, Sajedi F, Rahgozar M, Noghabi FA. The effect of kangaroo care on behavioral responses to pain of an intramuscular injection in Neonates. *J Spec Paediatr Nurs* 2008; 13: 275–80.
- Feldman R, Eidelman AI, Sirota L, Weller A. Comparison of skin-to-skin (kangaroo) and traditional care: parenting outcomes and preterm infant development. *Pediatrics* 2002; 110: 16–26.
- Eriksson M, Carvalho Lamy Z, Tingvall M, Anderzén-Carlsson A. Parent's experience of providing skin-to-skin care to their newborn infant. A metastudy. *Acta Paediatr* 2010; 99(Suppl. 462): 101–2.
- Franck LS, Bernal H, Gale G. Infant holding policies and practices in neonatal units. *Neonatal Netw* 2002; 21: 13–20.
- Bergh AM, Arsalo I, Malan AF, Patrick M, Pattinson RC, Phillips N. Measuring implementation progress in kangaroo mother care. *Acta Paediatr* 2005; 94: 1102–8.
- Engler AJ, Ludington-Hoe SM, Cusson RM, Adams R, Bahnsen M, Brumbaugh E, et al. Kangaroo care: national survey of practice, knowledge, barriers, and perceptions. *MCN-Am J Matern Child Nurs* 2002; 27: 146–53.
- Biostatistics FnCaDoCEa. Evidence-based clinical practice guidelines for an optimal use of the Kangaroo Mother method in preterm and/or low birthweight infants. Bogota: Pontificia Universidad Javeriana, 2007.
- Committee on Fetus N. Levels of Neonatal Care. *Pediatrics* 2004; 114: 1341–7.
- Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of good practice for the translation and cultural adaptation process for Patient-Reported Outcomes (PRO) measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health* 2005; 8: 94–104.
- World Health Organisation. Kangaroo mother care: a practical guide. Geneva: WHO Department of Reproductive Health and Research, 2003, ISBN 9241590351.
- Ludington-Hoe SM. Thirty years of Kangaroo Care science and practice. *Neonatal Netw* 2011; 3: 357–62.
- Blomqvist YT, Nyqvist KH. Swedish mothers' experience of continuous Kangaroo Mother Care. *J Clin Nurs* 2010; 20: 1472–80.
- Nyqvist K, Anderson G, Bergman N, Cattaneo A, Charpak N, Davanzo R, et al. Towards universal Kangaroo Mother Care: recommendations and report from the First European conference and Seventh International Workshop on Kangaroo Mother Care. *Acta Paediatr* 2010; 99: 820–6.
- Franck LS, Cox S, Allen A, Winter I. Measuring neonatal intensive care unit-related parental stress. *J Adv Nurs* 2005; 49: 608–15.
- Latva R, Korja R, Salmelin RK, Lehtonen L, Tamminen T. How is maternal recollection of the birth experience related to the behavioral and emotional outcome of preterm infants? *Early Hum Dev* 2008; 84: 587–94.
- Moore ER, Anderson GC, Bergman N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev* 2007; 3: Art. No.: CD003519. DOI: 10.1002/14651858.CD003519.pub2.
- Anderson GC, Chiu SH, Dombrowski MA, Swinth JY, Albert JM, Wada N. Mother-newborn contact in a randomized trial of kangaroo (skin-to-skin) care. *J Obstet Gynecol Neonatal Nurs* 2003; 32: 604–11.
- Wallin L. Knowledge translation and implementation research in nursing. *Int J Nurs Stud* 2009; 46: 576–87.
- Westrup B, Stjernqvist K, Kleberg A, Hellstrom-Westas L, Lagercrantz H. Neonatal individualized care in practice: a Swedish experience. *Semin Neonatol* 2002; 7: 447–57.
- Kaarsen PI, Ronning JA, Tunby J, Nordhov SM, Ulvund SE, Dahl LB. A randomized controlled trial of an early intervention program in low birth weight children: Outcome at 2 years. *Early Hum Dev* 2008; 84: 201–9.
- Axelin A, Kauppila W, Ahlqvist-Björkroth S, Boukydis Z, Lehtonen L. The Influence of the Close Observation and Collaboration (CLOC) Training Program on the Caring Practices of NICU Staff. Tampa, FL: Congress abstract, The 25th Annual Gravens Conference, 2012.
- Bahtsevani C, Willman A, Stoltz P, Ostman M. Experiences of the implementation of clinical practice guidelines – interviews with nurse managers and nurses in hospital care. *Scand J Caring Sci* 2010; 24: 514–22.

27. Kitson A, Harvey G, McCormack B. Enabling the implementation of evidence based practice: a conceptual framework. *Qual Health Care* 1998; 7: 149–58.
28. Greisen G, Mirante N, Haumont D, Pierrat V, Pallás-Alonso CR, Warren I, et al. Parents, siblings and grandparents in the Neonatal Intensive Care Unit A survey of policies in eight European countries. *Acta Paediatr* 2009; 98: 1744–50.
29. United Nations. Convention on the Rights of the Child. New York, NY: United Nations, 1989.
30. Levin A. Humane neonatal care initiative. *Acta Paediatr* 1999; 88: 353–5.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Figure S1 Time a stable premature infant cared for in an incubator (a) or a cot (b) would normally receive skin-to-skin care per day.

Figure S2 Mean values of how comfortable the respondents from different countries were to enable skin-to-skin care in

12 different situations or medical conditions. Answers range from 1 = very uncomfortable to 5 = very comfortable. Error bars represent 1 SD. Differences between countries were statistically significant for Denmark versus Finland, Norway and Sweden (***) , Finland versus Norway and Sweden (***) and Denmark versus Iceland (**) (Scheffe's *post hoc* test).

Figure S3 Number of respondents reporting possible benefits of skin-to-skin care. Each respondent could choose the three most important motives for using SSC.

Table S1 Barriers reported for implementing skin-to-skin care at the own unit. The numbers indicate the proportion of respondents rating the barrier as 4 or 5 on a scale ranging from 1: not influential at all to 5: very influential.

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