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Post-Partum Skin-to-Skin Care and Infant Safety: Results of a State-Wide Hospital Survey

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Abstract

Objectives. Survey current experience with Skin to Skin care (SSC) in Pennsylvania Maternity Centers. **Study Design.** The nursing director of each Maternity Center in PA (n=95) was sent an on-line confidential survey querying SSC practices. Responses were compared by delivery size, location, and nature of affiliation. Statistics analyzed by chi-square and student t-test. **Results.** Of these 64/95 MCs (67%) responded. All allowed SSC after vaginal deliveries, 55% after C-section, 73% mother's room. Monitoring included delivery room nurse (94%) with support from other providers (61%), family members (37%), and electronic monitoring (5%). If SSC occurred in mother's room all reported family education on safe practices. 40% were aware of adverse SSC events, including falls and suffocation. About 80% educated staff about infant safety during SSC. **Conclusions.** Gaps in education and supervision during SSC were identified. Additional education and standardization of best practices are needed to reduce risks from falls and suffocation during SSC.

Keywords

skin to skin, care, infant, safety

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What do we already know about this topic?

Although the benefits of Skin-to-Skin care in the immediate postnatal setting are significant, potential risks to the newborn include falls from the maternal bed or suffocation events that can lead to sudden unexpected postnatal collapse.

What does our research contribute to the field?

Our research describes the current practice and experience with skin -to-skin care in PA maternity centers including staff and patient education and occurrence of adverse events.

What are your research implications toward theory, practice or policy?

Our research revealed deficiencies in the practice of skin-to-skin care in PA maternity centers including inadequate education of both staff and patients on the unique infant safety issues that can occur during the practice.

Introduction

Kangaroo Care, the forerunner of skin to skin Care (SSC), was first described in 1978 when it was shown to increase survival of low birth weight and preterm infants in Columbia.¹ Its use evolved to include term and near-term infants and ultimately became known as SSC. Currently, the practice of SSC between mother and infant occurs immediately postdelivery and throughout the postpartum period and is promoted for the purpose of facilitating bonding, supporting breastfeeding, and

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fostering neonatal physiologic homeostasis.²⁻⁷ The evidence supporting the use of SSC to foster these goals led the American Academy of Pediatrics in 2005 and then the National Resuscitation Program in 2006 to recommend SSC for all healthy term infants.^{8,9} In 2009, in the US, SSC became a Joint Commission Perinatal Care Measure.¹⁰ SSC is part of the Ten Steps to Successful Breastfeeding of the Baby Friendly Hospital Initiative, and has been implemented by over 600 hospitals in the US and in over 20 000 maternity facilities in 150 countries worldwide.¹¹ It has become the standard of care for optimally supporting breast feeding from birth to hospital discharge and beyond.¹²

Although the benefits of SSC are significant, the potential risk to the infant during SSC of either a fall from the maternal bed or sudden unexpected postnatal collapse (SUPC) has been described.¹³⁻¹⁸ The Committee on the Fetus and Newborn and the Task Force on Sudden Infant Death Syndrome of the American Academy of Pediatrics recognized the occurrence of these events and issued a clinical report addressing the infant safety concerns as related to both safe sleep and SSC.¹⁵ The report noted that the use of a standardized approach to implementation of both SSC and rooming-in practices may prevent these adverse events.

Objectives

In 2014, the Pennsylvania (PA) Department of Health developed and implemented the quality improvement Keystone 10 Initiative with the goal of increasing the initiation, duration, and exclusivity rates of breastfeeding throughout PA. The program which is based on similar efforts in other states is a voluntary initiative that was developed to align closely with the Ten Steps to Successful Breastfeeding that serve as core components of the World Health Organization's Baby Friendly Hospital Initiative (BFHI). Keystone 10 promotes both SSC and rooming-in and engages PA birthing facilities to adopt and implement these evidence-based maternity care practices.¹⁹

The Infant Safe Sleep Committee of the PA Chapter of the American Academy of Pediatrics, composed of pediatricians and others with expertise in Sudden Unexpected Infant Death (SUID), saw this state-wide initiative as a unique opportunity to investigate how birthing facilities in PA were balancing the promotion of SSC with the need to protect infants from potentially serious adverse events including suffocation and falls. Our objectives were as follows:

1. To define the current practice of SSC as it is occurring within PA maternity centers.

2. To identify if further education and awareness of the safety issues associated with SSC as well as the institution of further preventive measures may be required to limit the occurrence of adverse events
3. To determine whether there were differences in responses as related to size of delivery service (<1000 deliveries per year, 1000-2500, >2500), location (rural, suburban, or urban), and affiliation of the maternity center (independent community, university affiliated, university center)

Methods

The Committee, with representation from a hospital-based neonatologist, and 3 current or former hospital-based pediatricians, created the questionnaire (Table 1) which queried aspects of SSC practices that addressed our objectives. A list of all maternity centers in PA (defined as a hospital maternity unit or a free-standing birthing center) as well as contact information for the nursing director of each was compiled. An email containing an introductory letter that explained the purpose of the study, emphasized the confidential nature of the responses and included a consent form, was sent to the nursing director of each center. Clicking on the link to the Survey Monkey questionnaire served as an indicator of consent to participate. Each institution was assigned a unique identifying number to track the data recorded in the system. It was possible to identify whether a particular maternity center had responded but not their individual answers. Each center self-identified as to their location (rural, suburban, or urban), delivery service size (<1000, 1000-2000, >2000 deliveries per year) and nature of their affiliation (independent, university affiliated, university). Efforts to increase participation occurred over a 9-month time period and consisted of repetitive emails, personal phone calls and a reminder letter sent by US mail. The original questionnaires were sent out in September 2017 and the last were returned in June 2018.

The study was approved by the WellSpan Health Institutional Review Board at York Hospital in York, PA (#1119234-2). Data were analyzed using SPSS V25.0 (IBM SPSS Statistics, 2015). Comparative statistics were analyzed by chi-square and student t-test. All survey results were securely stored in a password protected data file in York Hospital.

Results

Of the 95 maternity centers in PA, 64 responded for a response rate of 67%. Of these 56 or 87% of respondents

Table 1. Survey Questions of PA Maternity Centers re Skin to Skin Practices.

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1. Approximately how many deliveries does your hospital do per year? (a) >2000; (b) 1500-2000; (c) 1000-1499; (d) <1000
 2. Is your hospital (a) a university teaching hospital; (b) affiliated with a university hospital; (c) Independent community hospital
 3. By geographic locale, would you describe the type of community you primarily serve as primarily (a) Rural; (b) Suburban; (c) Urban
 4. Approximately what percentage of your maternity patients receive health insurance through the PA Medical Assistance program? (a) 75%-100%; (b) 50%-74%; (c) 25%-49%; (d) <25
 5. Is your Hospital a participant in the Keystone 10 program? Y N
 6. Is your Hospital certified as Baby Friendly? Y N; If you answered No, is your hospital working toward Baby Friendly recognized Y N
 7. Does your hospital have a policy and procedure in place for the practice of skin to skin care (a) Immediately postpartum in the delivery area after a vaginal delivery? Y N; (b) Immediately postpartum in the OR after a C-section? Y N; (c) In the mother's room? Y N
 8. If you answered no, to either of the above questions, would you like assistance with developing such a policy and procedure? Y N (If you answered yes to this question please contact the PAAAP Safe Sleep Committee)
 9. What percentage of your new mothers experience skin to skin with their infant immediately postdelivery? (a) ≥80%; (b) 60%-79%; (c) 40%-59%; (d) <40%; (e) we don't do skin to skin
 10. If you are practicing skin to skin, how long has your hospital been offering this experience to its' new mothers? (a) >1 year; (b) 6-12 months; (c) <6 months
 11. If skin to skin does occur immediately postpartum, what systems are in place to monitor mother and infants? (Circle all that apply) (a) Delivery room nurse; (b) Nurse or other health care provider designated to monitor mother infant dyad throughout skin to skin experience (c) Family member; (d) Electronic monitoring device; (e) Other (please specify)
 12. If you do practice skin to skin care on the maternity floor, are mothers given strategies to help minimize the risks of the mother potentially falling asleep with the baby during skin to skin? Y N
 13. If you answered yes to the above question, could you describe what some of those strategies are?
 14. Do you have a quality assurance program in place to monitor compliance with skin to skin policies and procedures whether it occurs in the delivery room or in the mother's room? Y N
 15. Have you ever felt that you did not have adequate staffing to provide proper monitoring of mother and infant during skin to skin in the immediate post delivery period? Y N
 16. Are you aware of any potentially serious adverse events that have occurred to infants during skin to skin contact either immediately postpartum or on the maternity ward? Y N
If you answered yes, please check which event(s) you are aware of. Check as many as apply. Infant Fall; Sudden Unexpected Infant Collapse; Near Miss; Suffocation; Other
 17. What members of the maternity care team are educated in infant safe sleep principles and practices? (circle all that apply) (a) Nurses; (b) Doctors; (c) Nurse's Aides or Nursing Assistants; (d) All members of maternity care team; (e) There is no required formal education on infant safe sleep practices
 18. Is there education given to staff on the specific issue of the unique safety concerns for the infant during skin to skin? Y N
 19. For staff who do receive education on infant safe sleep practices and/or infant safety during skin to skin, how is this education accomplished? (Circle all that apply) (a) Computer based program/presentation that is accessible to the user at any time; (b) Formal lecture; (c) Educational materials on Safe Sleep are provided and the recipient is expected to read information and incorporate into their practice; (d) One on one teaching from educator to staff member: (e) Other (Please specify)
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identified themselves as participants in the Keystone 10 Initiative. Five (7.8%) reported being certified as Baby Friendly and 19 (32%) stated they were working toward Baby Friendly recognition. We estimated that the maternity centers who responded represented approximately 93 423 of the 136 950 or 68% of the deliveries that occur each year in PA.²⁰

Response rates for PA maternity centers by delivery service size, affiliation, and location are shown in Table 2 and are compared to their proportional representation throughout the state. There was a lower response rate for

urban maternity centers ($P=.001$), a higher response rate for suburban facilities ($P=.02$) and a similar response rate for rural MC's. No difference in response rate was seen however when maternity centers were compared for either delivery service size or nature of maternity centers affiliation.

All the responding centers reported practicing SSC and 95% had a policy and procedure in place for the practice. All centers applied their SSC policies in the delivery area after vaginal birth, but fewer applied them immediately after Cesarean delivery (55%) or in the

Table 2. A. Delivery Service Size of Responding Maternity Centers (N=64).

Deliveries/Year	Survey (n=64) %	State (n=95) %	P-value
<1000	48	51	.712
1000-2000	30	29	.892
>2000	22	20	.761

B. Hospital Affiliation of Responding Maternity Centers (N=64).

Hospital affiliation	Survey (n=64) %	State (n=95) %	P-value
Independent community	61	57	.617
University affiliated	28	31	.686
University teaching	9	11	.684

C. Hospital Location of Responding Maternity Centers (N=64).

Hospital category	Survey (n=64) %	State (n=95) %	P-value
Rural	45	43	.804
Suburban	42	34	.02
Urban	11	21	.001

mother's room (73%). Over two-thirds of the centers reported that >80% of their mothers experienced SSC immediately post-delivery. Most centers (90%) had been practicing SSC for greater than 1 year. There was no difference in time practicing SSC with regards to the delivery size, location, or affiliation of the maternity center.

A delivery room nurse was given the responsibility to monitor the mother and infant immediately postpartum during SSC 94% of the time. Others who might be called upon to assist in this process included another health care provider (61%), or a family member (37%). Use of an electronic device was also described (4.7%). The exact nature of the monitoring was not specified. Of maternity centers practicing SSC on the maternity floor, all reported providing mothers with strategies to help minimize the risk of falling asleep with the baby during SSC (Table 3).

Some examples of these strategies included always having another adult in the room during SSC, calling for nursing assistance if the mother is alone and getting drowsy, education on infant safe sleep practices, and posters and crib cards reminding parents to place the infant back into the crib if they are feeling drowsy. There was no difference in response to this question as related to size ($P=.552$), location ($P=.274$), or affiliation ($P=.228$) of the maternity center.

About 40% of maternity centers responded that they were aware of potentially serious events that had occurred either immediately postpartum or on the maternity ward during SSC. Awareness of infant falls was noted by 28% of responders, and 19% reported awareness of suffocation events. There was no difference in incidence of each of these specific types of events by

either delivery service size ($P=.552$) or affiliation ($P=.986$). A difference was noted for infant falls for maternity centers location with 10.3% of rural facilities reporting falls versus 29% of urban maternity centers ($P=.006$). There was no difference in reports of suffocation events with regards to size, location or affiliation of maternity centers.

About 75% of centers indicated that they provided education to the nursing staff on infant safe sleep practices, 23% to the doctors, 28% to nurse's aides or assistants, and 41% to all members of the maternity care team. Five centers reported that there was no specific training on infant safe sleep practices provided to staff.

About 80% provided educational programming for staff that specifically addressed the unique infant safety issues as related to the practice of SSC. The most commonly used resource was the distribution of educational materials that the specified staff was expected to read and incorporate into practice (76%). Other modalities used were computer-based learning modules (42%), formal lectures (28%) or direct one on one training (48%). Some centers indicated that the safety concerns related to SSC continued to be addressed during yearly competency refresher courses. Over a third of respondents indicated that they would like more assistance in the development of policies and procedures regarding SSC. There was no difference in response to this query with regards to size, location or affiliation of maternity center.

Discussion

This survey describes the current practice of SSC in PA maternity centers. There was little difference in response

Table 3. Examples of Strategies Given to Mothers to Reduce Risk of Falling Asleep During Skin to Skin.

Educate Mother and Family Members one on one verbally and with written handouts about safe practices for infant during SSC
Mother signs Mother/Baby safety pledge after education about safe SSC practices
Educate Mother and Family Members about importance of wakefulness of mother during SSC;
Encourage lights on, mother sitting upright, no distractions
Always have a family member, nurse, or friend present during SSC
While SSC is occurring, mother is screened for wakefulness and checked frequently by nursing staff;
Ongoing education of mother and family
Mother advised to immediately place infant in bassinet if feeling drowsy; call nurse if need assistance
Make Sure Nurse Call Bell is in Easy Reach of mother
Signage in the mother's room about infant safety and procedures during SSC
Safety advice includes no cell phone use during SSC
SSC infant safety video shown
Safe Sleep Posters and crib cards reminding parents of safe practices during SSC
No SSC is allowed during the night
Use of "Halo" bassinet that allows mother to easily place infant in crib without getting out of bed
If SSC is occurring, a timer is set such that the nurse must check on baby every 15 minutes
Hourly infant safety checks by nursing staff regardless of whether SSC is occurring or not

as related to size of delivery service, location or nature of affiliation. The reported awareness of serious adverse events (40%), falls (28%), and suffocation events (19%) reflects the same concerns that were voiced in the clinical report issued by the Committee on the Fetus and Newborn and Task Force on Sudden Infant Death Syndrome of the American Academy of Pediatrics on SSC in 2016.¹⁵ Although their data is not specific to SSC, the PA Patient Safety Authority has described over a 9-fold increase in falls that occurred to hospitalized infants during the first month of life from 2005 to 2013 as SSC and rooming-in were becoming more common.²¹ About 85% of the events occurred at less than 4 days of age, most were within the first 48 hours of life and many were associated with family members falling asleep and dropping their newborn. More recent data from the PA Patient Safety Authority continues to show an increase in reports of serious adverse events to infants from 2014 to 2018 (personal communication). Bittle et al²² reported that postpartum infant falls were primarily related to mothers falling asleep while holding their infant and urged both awareness of and incorporation of maternal fatigue into all SSC monitoring policies.

With the increased practice of SSC both in Europe and the United States, incidents of infant complications during SSC including falls and SUPC have been reported.²³⁻²⁷ SUPC as specifically related to SSC was described in a review of 398 published European case reports, where one-third of the events occurred in the first 2 hours of life and were associated with SSC as well as prone positioning and bedsharing.¹³ A 14-fold increase in SUPC was noted in Spain after the introduction of SSC practices.²³ Similar reports have also appeared from Germany, Britain, and Australia.²⁴⁻²⁶

Lack of knowledge of proper SSC technique and SSC with inadequate surveillance are among the factors identified as being associated with SUPC.¹³ Our reported awareness of falls and suffocation events is consistent with these reports.

In the US, using data from CDC Wonder, Bass et al¹⁴ calculated an eleven fold increase in neonatal deaths attributable to Mechanical Suffocation Bed or Cradle or Accidental Suffocation and Strangulation Bed in 2014 as compared to 1995. Similarly the overall proportion of Sudden Unexpected Infant Death (SUID) in the neonatal period increased by 22% in that same time period. As the first 6 days of life accounted for 29.2% of all neonatal SUIDs they speculated that the increase in unexpected deaths may be due to enhanced recognition of SUPC. Although the inclusion of infants of 35 weeks of gestation or less in these calculations was questioned,²⁸ the trend toward an increased incidence of deaths during the time period remains. In contrast, Bartick et al²⁹ looked at CDC Wonder Data for SUID and ASSB as well as data from the Massachusetts (MA) Department of Public Health to track infant deaths in the first 6 days of life from 2004 to 2016. They concluded that increasing rates of breastfeeding initiatives and SSC were associated with a decreasing prevalence of SUID in this age group in both MA and the US. During the study period, however, the US prevalence of ASSB actually increased which the authors explained as due to a change in coding practices and not suggestive of increasing suffocation deaths. It is worth noting, however, that in MA there were only 22 reported SUID deaths over the 13 year study period (distribution not reported) and no deaths due to ASSB which makes it difficult to assess the association between breast

feeding initiatives and SSC and early infant deaths. Nonetheless, these numbers from MA do appear encouraging. It would be helpful to know what monitoring systems are in place during SSC in this state.

Our survey showed a wide range of approaches to supervision of the mother/infant dyad during postpartum SSC. The primary procedure was direct observation by a nurse or other health care provider. Family members were identified as participants in this role, but the exact nature and scope of their responsibility could not be assessed. The use of any non-medical, untrained observers to perform this task during such a vulnerable time period is questionable. In the case series by Thach other individuals were present in the room in 10 of the 18 SUPC events.¹⁷ With the exception of 3 maternity centers who noted the use of electronic monitoring to aid in this process there was no specific mention of any documented monitoring and/or recording of infant wellbeing during SSC.

The lack of staff education on either infant safe sleep (>50%) or on the unique safety concerns for the infant during SSC (20%) was concerning as virtually all maternity centers had policies and procedures in place for SSC postpartum for vaginal birth (95%) and in the mother's room when being practiced (100%). Given that two thirds of SUPC events occur after the first 2 hours of life, it is imperative that policies and procedures and staff education for SSC be in place in all areas where it occurs. Comprehensive education and awareness approaches to preventing both falls and SUPC have been described.³⁰⁻³⁴ They include the use of increased frequency of infant assessments (Respiratory Activity, Perfusion, Position or RAPP) and increased documentation of infant wellbeing. The addition of the use of pulse oximetry was shown to decrease the incidence of postpartum SUPC in a large urban delivery center.³⁴ Additional research needs to be done to determine the best and least invasive approach to monitoring the mother infant dyad during SSC in each of the locations where it is occurring. Mothers may also choose to continue the practice of SSC in the home environment where they are more likely to be alone and thus at greatest risk of falling asleep unobserved. Infant safe sleep education during the stay in the MC must emphasize that SSC only be performed when the mother has removed pillows and excess bedding from her immediate surroundings and when she is alert or can be carefully observed by an alert adult.

Irrespective of delivery service size, many respondents did not always feel that they had adequate numbers of staff to properly monitor SSC. The Association of Women's Health Obstetric and Neonatal Nurses (AWHONN) recommends no more than 3 mother-infant

dyads be assigned to 1 nurse so that the nursing staff are immediately available and able to regularly monitor the pair.³⁵ We did not query whether there was a specific protocol in place that would restrict the practice of SSC either post-delivery or on the maternity floor if enough staff were not available to adequately monitor infant safety.

The impact of SSC on the early initiation and promotion of ongoing breastfeeding is well documented. With the myriad of positive advantages that accrue to the breastfed infant, the potential contribution of SSC as it relates to increased breastfeeding rates in reducing health disparities, particularly among racial or other ethnic groups, cannot be underemphasized. Since the inception of the Keystone 10 quality improvement breast feeding initiative that promotes the practice of SSC in PA maternity centers, PA has seen significant increases in the numbers of both Black and Hispanic mothers who initiate breastfeeding. Although still lagging behind their white counterparts in both initiation and duration of breast feeding, significant progress has been made in narrowing the gap.³⁶ This success is consistent with data from an intensive in hospital breastfeeding quality improvement study by Merewood et al³⁷ In addition to showing an overall increase in initiation and exclusive breastfeeding rates, they also demonstrated a 9.6% decrease in disparity of breastfeeding initiation rates between Black and Caucasian mothers. Therefore the creation of protocols that support both the safety and wellbeing of mother and infant during SSC can be a critical tool to reduce health disparities and improve outcomes for both mother and infant. We believe that our findings provide a starting point and reference for future work and discussion around providing a safe and nurturing SSC experience. Further research to delineate best practices for infant monitoring during SSC is critical to this process.

Limitations of this Study

This is a descriptive study which is limited by a 67% response rate despite multiple attempts by the authors to reach out to all the maternity centers surveyed. The reasons for no response to the survey could not be determined and present a potential source of bias. Given the large number of deliveries represented by this survey and the proportional representation of all types of maternity centers in the state, we feel that our results are a valid reflection of statewide PA SSC practices and experiences. Although our results cannot be generalized to other US states, they are concerning enough that they should support the need for similar surveys to be done in other states to assess their own experiences with infant

safety during SSC. Responses were based on the reporting of a single manager or their agent raising the potential of bias based on that individual's perception. The assurance of complete confidentiality should have promoted honesty in the responses but there was no way of assessing this. Not querying where the adverse events that were reported occurred, limits the interpretation and analysis of our results. Even with these considerations, it is concerning that among the respondents, there were reports of significant gaps in education of both staff and families, gaps in basic practice issues, and reports of multiple potentially adverse events during SSC.

Summary and Conclusions

Our survey has revealed deficiencies in the practice of SSC in maternity centers in PA that may have contributed to an unexpectedly high number of reports of adverse infant events. While we fully embrace the importance of SSC in promoting successful breastfeeding, our findings underscore the need for all maternity centers to provide both staff and patient education on infant safe sleep and the unique infant safety issues that occur during SSC. Strict policies and procedures guiding the practice of SSC in all locations must also be in place. This includes careful attention to staffing to allow appropriate observation of the mother-infant dyad as well as ongoing continuous quality improvement evaluations to assure maximum safety for the infant. We believe that our findings provide a starting point and reference for future work and discussion around the critical safety issues for newborns during SSC. Further research to delineate best practices for infant monitoring during SSC is critical to this process.

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Author Contributions

All authors contributed equally to the creation of this manuscript and all gave approval to the final document.

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