



Newborn Falls in Pennsylvania:

An Analysis of Recent Events and
a Review of Prevention Strategies

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Connor Donnelly as an infant and at 5 years old.



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I was afraid that I was going to get a social worker call... I think hospitals need to not only provide education to parents and caregivers, but also show some care and concern for the parents who experience a fall accident.

- Annie Donnelly

Abstract

Despite increasing recognition of the potential risks associated with in-hospital newborn falls among health professionals, new parents are frequently unaware of the possibility of dropping their newborn, especially in the hospital. Although most newborn falls do not result in lasting harm to the newborn, they may necessitate additional healthcare services and cause stress to all involved parties. An analysis of reports submitted to the Pennsylvania Patient Safety Reporting System (PA-PSRS) from January 2014 through December 2018 identified 318 events specifically related to newborn falls in the hospital following birth. An increase in the number and rate of serious newborn fall events reported to PA-PSRS was observed compared with a previous analysis by Wallace. Newborn falls were most commonly associated with a caregiver falling asleep (168 events, or 52.8%) and with newborn feeding (72 events, or 22.6%). Strategies to prevent newborn falls in the hospital include focusing efforts on providing support for exhausted parents during the critical time following the birth, offering periods of rest for new parents whenever they are tired, increasing the frequency of rounding when new mothers are breastfeeding, and promoting a midday break in visiting hours.

Keywords: newborn fall, newborn drop, infant fall, maternal fatigue, breastfeeding, fall prevention

Introduction

Several years ago, Annie and Brad Donnelly experienced a newborn fall during their hospital stay after the delivery of their first child, Connor. Annie recently spoke with one of the authors about her experience, in the hope of preventing other families from going through a similar situation. She described the fall:

"The night before we were leaving, I was so tired that Brad told me to switch positions and try to sleep on the pullout chair instead of in the bed. He said that he would watch Connor. By that point, neither one of us had really had time to close our eyes. While Brad was holding Connor in the bed, he became so comfortable that he accidentally fell asleep. The railing was up on one side but not the other, and that's where Connor slipped out of Brad's hands and received a contusion on the left side of his head. It happened very fast."

Annie shared that Connor was transferred to the neonatal intensive care unit (NICU) for a short period following his fall, but he did not sustain any permanent injuries. The emotional repercussions of the fall experienced by Annie and Brad were more significant. She explained:

"When the nurse came in, I was explaining what had happened. Nobody said, 'This was an accident.' I was afraid that I was going to get a social worker call. Nobody was saying, 'Accidents happen. It's not uncommon.' Nobody was consoling. Brad was completely mute, and he was just crying in the corner. Absolutely horrible. No one, not a counselor or a nurse, was with us from the time that they took Connor down to CT to the time that they came and told us his update. I paced the hallway. I called my aunt to come. I didn't know what was going on. I think hospitals need to not only provide education to parents and caregivers, but also show some care and concern for the parents who experience a fall accident."

A newborn fall or drop may be defined as an unplanned or unintentional event that occurs when a newborn descends from a raised surface, such as a bed or couch, or is dropped from the arms of a caregiver, and comes to rest on the floor or another surface with or without injury to the newborn.¹ Recognition of the

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potential risks associated with in-hospital newborn falls has been increasing among health professionals and within hospitals and health systems. In the last five years alone, numerous reports and analyses have been published on the subject of newborn falls. On the other hand, new parents are frequently unaware of the possibility of dropping their newborn in the hours and days following childbirth. Although most newborn falls do not result in lasting harm to the newborn, they may necessitate additional healthcare services for the newborn. In addition, any caregivers involved in a newborn fall, including parents, other family members, and hospital staff (often collectively referred to as second victims), may experience distress following a newborn fall.¹

In Pennsylvania, patient safety events, including reports of in-hospital newborn falls, are collected through the Pennsylvania Patient Safety Reporting System* (PA-PSRS). In 2014, Wallace published an article that analyzed newborn fall events submitted to PA-PSRS from 2004 through 2013.² In order to provide an update on newborn falls in Pennsylvania, the present article analyzes newborn fall events submitted to PA-PSRS from 2014 through 2018. In addition, recommendations for best practices for the prevention of newborn falls are also shared.

Methods

We queried the PA-PSRS database for events submitted from January 1, 2014, through December 31, 2018. We identified events for analysis if the event type was classified as “Falls” or “Other” and contained one of the following keywords in the event detail: “fall,” “fell,” “drop,” “sleep,” “slip,” or “unrespon.” To limit the search to newborns, we specified patient age for events as 30 days or less. Each event report retrieved by this query was individually reviewed to ensure that it was specifically related to a newborn fall.

We calculated annual newborn falls rates in Pennsylvania. Newborn fall events were also classified according to:

- time of day when the fall occurred
- time since birth when the fall occurred
- primary circumstance leading to the fall

*PA-PSRS is a secure, web-based system through which Pennsylvania hospitals, ambulatory surgical facilities, abortion facilities, and birthing centers submit reports of patient safety-related incidents and serious events in accordance with mandatory reporting laws outlined in the Medical Care Availability and Reduction of Error (MCARE) Act (Act 13 of 2002). All reports submitted through PA-PSRS are confidential, and no information about individual facilities or providers is made public.

[†]The Pennsylvania Health Care Cost Containment Council (PHC4) is an independent state agency responsible for addressing the problem of escalating health costs, ensuring the quality of healthcare, and increasing access to healthcare for all citizens regardless of ability to pay. PHC4 has provided data to this entity in an effort to further PHC4’s mission of educating the public and containing healthcare costs in Pennsylvania. PHC4, its agents, and staff, have made no representation, guarantee, or warranty, express or implied, that the data—financial, patient, payor, and physician-specific information—provided to this entity, are error-free, or that the use of the data will avoid differences of opinion or interpretation. This analysis was not prepared by PHC4. This analysis was done by the authors. PHC4, its agents and staff, bear no responsibility or liability for the results of the analysis, which are solely the opinion of this entity.

[‡]The details of the PA-PSRS event narratives in this article have been modified to preserve confidentiality.

- factors potentially contributing to the fall
- primary caregiver involved in the fall

The full range of events were identified and analyzed, from near-miss events to events with varying levels of harm. For this analysis, a near-miss event was defined as a circumstance that had the potential to cause a newborn fall but did not result in a fall. Near-miss events were identified by manual review. Serious newborn fall events, which are events that caused harm to the patient that required additional healthcare services, were identified based on harm scores assigned by the reporting facility.

Results

The query returned 994 records reported during the five-year study period. An initial review of all events revealed that many of the records were related to adult falls, possibly because the patient age in days was recorded as 0 in PA-PSRS in numerous events submitted via the interface. An analyst reviewed each individual event and identified 332 events related to potential or actual newborn falls. Of these, 318 unique events were related to an actual newborn fall, and 14 events were identified as near misses. In one instance, a single newborn fall event was reported twice, first after the initial fall, and subsequently after the newborn experienced a change in vital signs and was transferred to a higher level of care; because these events pertained to the same event, they were merged and treated as a single event.

Annual Rate of Newborn Falls

The annual rate of newborn falls was reported per 10,000 live births, which is the standard across other newborn falls studies. To calculate this rate, we used the number of newborn fall events reported to PA-PSRS each year and the number of live births reported by the Pennsylvania Health Care Cost Containment Council (PHC4) each year.[†] Annual rates of newborn falls ranged from 3.7 to 5.9 falls per 10,000 live births from 2014 to 2018, with an average annual rate of newborn falls of 4.8 falls per 10,000 live births over the five-year study period. Annual rates of newborn falls are found in Figure 1.

Timing of Newborn Falls

More than two-thirds of newborn fall events reported to PA-PSRS from 2014 through 2018 occurred within the first 72 hours following birth. Among the 332 newborn fall events analyzed (including near misses), a total of 230 events (69.3%) occurred within the first 72 hours, and 300 events (90.4%) occurred within the first seven days. Notably, nearly one-third of newborn fall events (30.7%; 102 of 332 events) occurred on the second day following birth, between 24 and 48 hours after birth.

Newborn fall events in this study were also analyzed to determine the time of day when events occurred, with falls broken down by hour of occurrence in **Figure 2**. The time of the fall was unspecified in 12 reports. Newborn fall events occurred most frequently from 4 a.m. to 5 a.m., with 33 of 320 newborn falls (10.3%) reported to have occurred during this timeframe.

Primary Circumstance Leading to the Newborn Fall

The primary circumstance contributing to each newborn fall event is summarized in **Figure 3**. Of the 318 newborn fall events reviewed (excluding near misses), 168 events (52.8%) took place after the caregiver fell asleep (166 events) or lost consciousness following a seizure (2 events). The following are examples[‡] of newborn falls that occurred following a caregiver falling asleep or losing consciousness:

Father sitting on side of bed holding newborn and fell asleep. Newborn fell to floor. Father uncertain if newborn hit head.

Mother had a seizure while holding infant. Mother fell to the floor, subsequently dropping the newborn.

Other primary circumstances contributing to newborn fall events included: caregiver dropped newborn while in motion (19.8%; 63 of 318 events), caregiver dropped newborn while stationary (12.6%; 40 of 318 events), and newborn fell from another surface, such as a bed or couch (5.7%; 18 of 318 events). The following are examples of events associated with each of these primary circumstances:

Mother attempted to get out of bed while holding newborn and dropped newborn from her arms onto the floor.

Father told nurse he dropped the newborn while sitting in a chair and the newborn hit her head.

Mother stated she placed newborn on top of a pillow on the bed and the newborn fell off the bed.

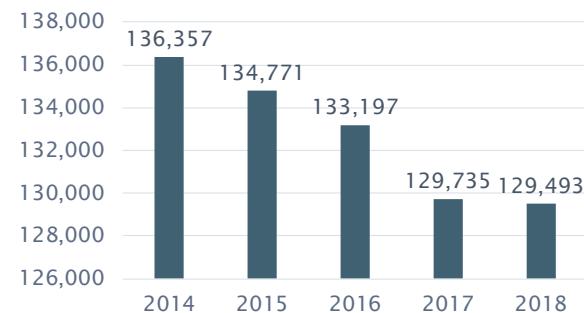
In 5 events (1.6%), the newborn fall occurred following a precipitous delivery. There was insufficient detail included in 24 events (7.5%) to determine the primary circumstance leading to those events.

Figure 1. Annual Rates of Newborn^a Falls in Pennsylvania

Number of Newborn Fall Event Reports^b, N=316



Number of Live Births^c



Rate of Newborn Falls Per 10,000 Live Births^{b,c}



^aPatients ≤ 30 days old.

^bReports submitted to PA-PSRS.

^cData obtained from PHC4.

neonatal abstinence syndrome noun

neo-na-tal ab-sti-nence syn-drome

As defined by the American Academy of Pediatrics

[¶] “a collection of signs and symptoms occurring in a newborn following delivery as a result of abrupt withdrawal from substances used or abused by the mother during pregnancy, including opioids.”³

serious event noun

se-ri-ous e·vent

As defined by Act 13 of 2002 of Pennsylvania

[§] “an event, occurrence, or situation involving the clinical care of a patient in a medical facility that results in death or compromises patient safety and results in an unanticipated injury requiring the delivery of additional healthcare services to the patient.”⁴

Potential Contributing Factors

Our analysis also identified potential contributing factors that newborn fall events shared in common. Here, we report contributing factors that were described in at least 1% of events (>3 events). The most frequently reported contributing factor was feeding of the newborn, which was mentioned in 72 of 318 events (22.6%); breastfeeding was specifically identified in 45 of these 72 events (62.5%). Burping was also listed as a contributing factor in 14 of 318 events (4.4%). Both feeding and burping were listed as a contributing factor in 5 of 318 events (1.6%).

The following are examples of events associated with feeding and/or burping:

While burping the newborn in a seated position, newborn pushed back on father's supporting hand. Father was unable to catch him and he fell to the floor.

After breastfeeding, while mother was repositioning, the newborn fell out of her hands onto the floor.

Bedding, such as sheets, pillows, and blankets, was described as a contributing factor in 18 of 318 events (5.2%). Equipment was listed as a contributing factor in 4 of 318 events (1.3%). The following are examples of events associated with bedding or equipment:

Mother propped newborn on bedlinens and pillow in center of bed. When mother shifted her weight and then got off of the bed, her newborn rolled onto the floor.

Father tripped over cords and fell with the newborn in his arms.

In 6 of 318 events (1.9%), the mother attributed the newborn fall, at least in part, to her hand or arm falling asleep or going numb. In 7 of 318 events (2.2%), monitoring and/or treatment for neonatal abstinence syndrome^{ae} were mentioned.

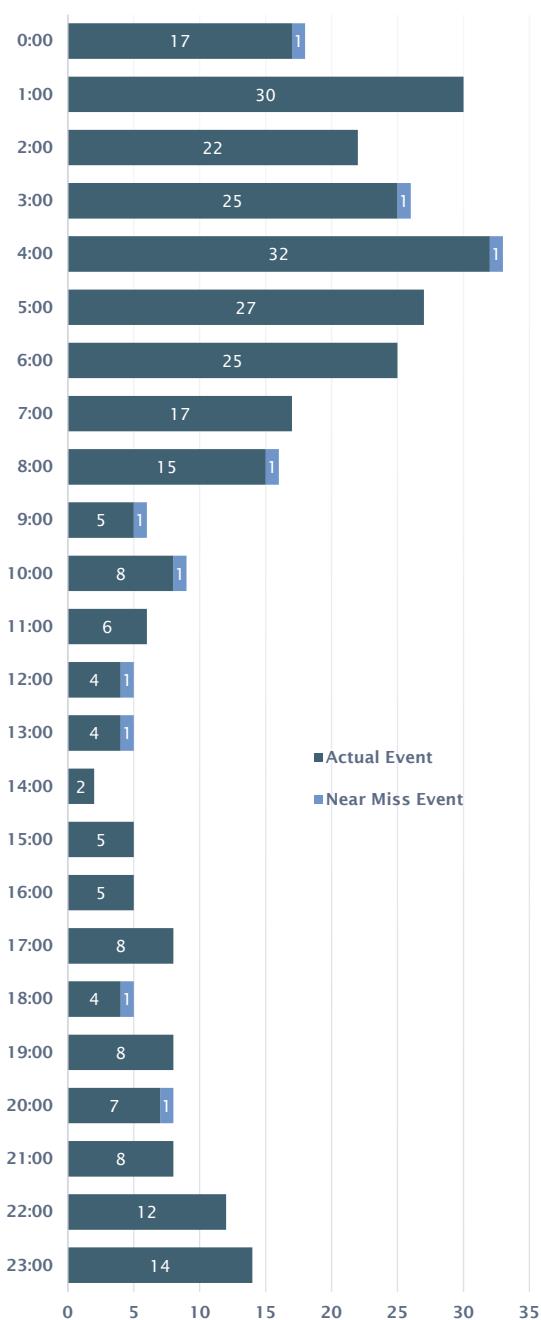
Primary Caregiver Involved in the Newborn Fall

Among 311 events that specified the primary caregiver involved in the newborn falls event (excluding precipitous deliveries and near misses), 263 events (84.6%) involved the mother, 32 events (10.3%) involved the father, 9 events (2.9%) involved another family member (most often a grandparent), 6 events (1.9%) involved a member of the hospital staff (most often a nurse), and 1 event involved an unspecified visitor.

Imaging Studies Following Newborn Falls

Among 72 events that indicated the newborn underwent one or more imaging studies following a fall, 55 newborns underwent a CT scan, 25 newborns underwent an x-ray, and 8 newborns underwent an ultrasound (including 1 who underwent a

Figure 2. Time of Day of Newborn Fall Events, N=320^a



^aIncludes actual events and near misses for which time of fall was specified in the report.

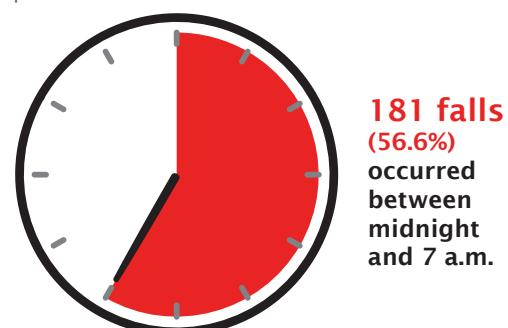
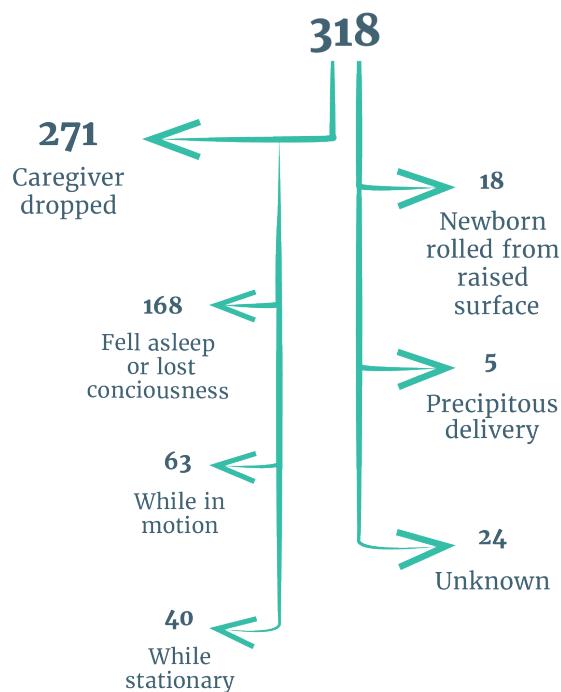


Figure 3. Primary Circumstance Leading to Newborn Fall, N=318



neurosonogram). Notably, none of the events involving a hospital staff member indicated that the newborn underwent any kind of imaging study following the fall.

Harm Resulting From Newborn Falls

Each event in PA-PSRS includes a harm score that describes the level of injury to the patient. Of the 318 newborn fall events reported to PA-PSRS from 2014 through 2018, 33 events (10.4%) were classified as Serious Events.⁵ None of the events resulted in permanent harm or death. In 21 of the 33 Serious Events (63.6%) reported, the newborn experienced temporary harm that required treatment or intervention; in the remaining 12 Serious Events (36.4%), the newborn experienced temporary harm that required initial or prolonged hospitalization. In several of these Serious Events, the newborn was transferred to another facility for a higher level of care, and the final outcome was not reported. Examples of temporary harm experienced by newborns who fell include bumps, bruises, swelling, hematomas, hemorrhages, and fractures. Fractures were reported in 25 of the 33 serious events (75.8%). The following is an example of a serious newborn fall event:

Mother fell asleep with the newborn laying on top of her and newborn fell to the floor. A CT scan showed a mildly displaced skull fracture with hemorrhage. Newborn was transferred to an outside children's hospital for further evaluation and was subsequently discharged.

Near-Miss Newborn Falls

As previously mentioned, 14 near-miss newborn fall events were reported to PA-PSRS from 2014 through 2018. All but one near-miss newborn falls event (92.9%; 13 of 14 events) involved the mother as the primary caregiver, and 11 of these events involved hospital staff finding the mother asleep with a newborn; in these cases, hospital staff intervened to prevent a newborn fall. A single event described a hospital staff member circumcising a newborn over a bed tray table, which the reporter felt had the potential to lead to a newborn fall.

Discussion

Annual Rates of Newborn Falls

Despite an increasing awareness of in-hospital newborn falls in recent years, experts on the subject have suggested that newborn fall events are underrecognized and underreported.⁵⁻⁷ Reasons for underreporting among family members may include embarrassment or the belief that the fall did not result in any apparent harm; among hospital staff members, underreporting has been attributed to fear of disciplinary action.⁶⁻⁸ Rates of in-hospital newborn falls in the literature vary considerably. In many early studies of newborn fall events, falls were relatively rare, and annual rates of 1.6 falls, 4.1 falls, 4.6 falls, and 5.9 falls, each per 10,000 live births, were reported.⁹⁻¹² In 2019, a health system consisting of five hospitals reported relatively higher, variable annual fall rates ranging from 6.03 to 12.58 falls per 10,000 live births systemwide over a five-year period.⁸ In 2016, a single hospital reported a rate of 21.2 falls per 10,000 births over a seven-month period.¹³

The analysis of newborn fall events published in 2014 by Wallace included estimates of annual rates of newborn falls in Pennsylvania that ranged from 0.4 to 3.8 events per 10,000 live births.² The present analysis showed an increase in reports of newborn fall events through PA-PSRS, with annual rates ranging from 4.0 to 5.9 events per 10,000 live births.

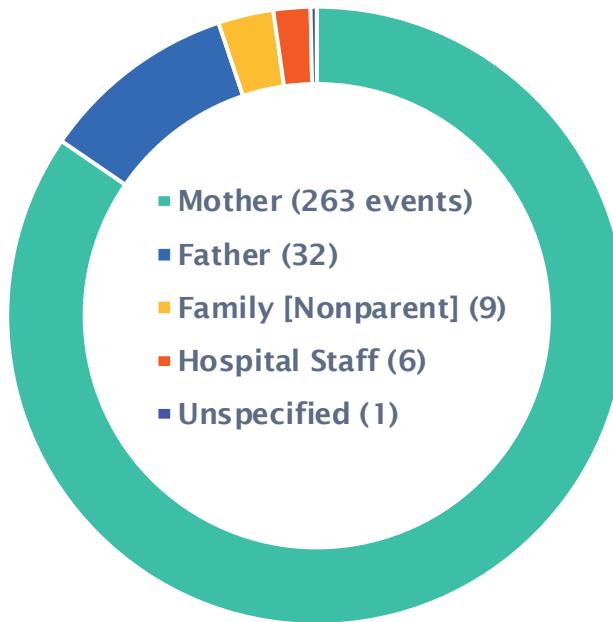
Increase in Reports of Serious Newborn Falls

An increase in the number and rate of serious newborn fall events reported to PA-PSRS was observed. Of the 272 newborn fall events (no near misses were identified) reported to PA-PSRS from 2004 through 2013, 23 events (8.5%) were classified as Serious Events.² Of the 318 newborn fall events (excluding near misses) reported to PA-PSRS from 2014 through 2018, 33 events (10.3%) were classified as Serious Events.

Breastfeeding and Maternal Sleep

More than half (52.8%) of the newborn fall events in

Figure 4. Primary Caregiver Involved, N=311



this study occurred when a caregiver, most often the mother, fell asleep with the baby in her arms or bed, and nearly one-fourth (22.6%) of events were associated with infant feeding, especially breastfeeding. There is substantial crossover between these groups; of the 72 events in which feeding was mentioned as a potential contributing factor to the newborn fall, 50 events (69.4%) identified the caregiver falling asleep as the primary contributing factor (Figure 5).

Many hospitals strongly encourage mothers to keep newborns in bassinets in their hospital rooms to promote bonding and breastfeeding in the immediate postpartum period. While the benefits of breastfeeding for both mother and baby are many, some recent commentaries and studies have suggested that this well-intentioned push for mothers to breastfeed exclusively around the clock may have unforeseen consequences for newborn safety. Mothers may experience fatigue, which may in turn lead to co-sleeping, putting the newborn at risk of a fall and suffocation.^{14,15}

Data from a recent study of maternal sleepiness in the postpartum period demonstrated that mothers slept on average only 3.7 hours per day and that only about 6.9% of mothers (7 of 101) were getting the recommended eight hours of sleep while in the hospital after childbirth.¹⁶ The relationship between breastfeeding and maternal sleep is complex. Another study looked at maternal sleep patterns among first-time mothers during the first 48 hours following delivery, and data from this study showed that mothers who breastfed slept on average 2.6

hours longer than mothers who bottle-fed ($P=.042$).¹⁷ However, a causal relationship between breastfeeding and maternal sleep cannot be established based on this limited data.

While newborn falls have been reported around the clock, numerous studies have identified the overnight hours as the peak time for in-hospital newborn falls to occur, and our analysis supports that finding.^{13,18,19} In our analysis of newborn fall events published in 2014, 58.0% of newborn falls (140 of 257) were reported to have occurred between midnight and 7 a.m.² Similarly, 56.6% of newborn fall events (181 of 320) in the present study were reported to have occurred during that same time period. The cluster of events during hours when parents or caregivers would otherwise be sleeping suggests that maternal sleep in the immediate postpartum period should be a focal point in newborn fall prevention strategies.

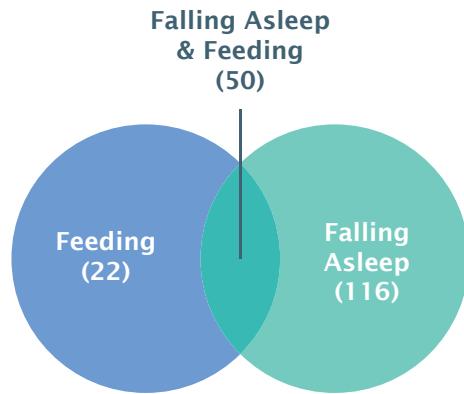
Newborn Fall Prevention Strategies

An analysis of near-miss newborn fall events has provided a window into awareness and prevention strategies already in place. Following a review of near-miss newborn fall events submitted to PA-PSRS from 2014 through 2018, we were able to identify a healthcare facility that has made great strides towards eliminating newborn falls: Penn Highlands Elk, a critical access hospital located in St. Marys, Pennsylvania, which is part of Penn Highlands Healthcare System. Nearly half of the 14 near-miss newborn fall events reported during the five-year study period were submitted by this single facility.

We reached out to Susan Dixon, RN, who is the patient safety/grievance officer and case management supervisor at Penn Highlands Elk. Dixon shared with us that following a newborn fall that occurred several years ago at her facility, she and members of her team conducted a root cause analysis and developed strategies to prevent future newborn falls.

Their team recognized parental fatigue as one important factor that may have contributed to the newborn fall at their facility. In order to educate new parents on potential safety issues, Dixon explained, "The first thing that we did as far as the action plan goes is that we changed the education that we give to parents." New parents are given a welcome letter that includes information on newborn safety and safe sleep and discourages co-sleeping. Parents are also encouraged to give their baby to nursing staff to take to the nursery if they are feeling tired or just need a break. While not mandatory, parents are strongly encouraged to have a break in visiting hours from 2 p.m. to 4 p.m. each day to give them the opportunity

Figure 5. Falls While Feeding & Sleeping



to rest. This practice has been implemented at all facilities across the health system.

Their team identified breastfeeding as another contributing factor. Nurses were already rounding every hour on the maternity ward, so this was increased to every 15 minutes as an added precaution when mothers are breastfeeding. To support the nurses in this practice, the director of the maternity unit purchased handheld timers as a reminder. This is also something that became a systemwide initiative across the health system.

Overall, awareness and education among hospital staff about newborn safety and safe sleep was also increased at their facility. Staff receive specific training to prevent newborn falls, and they also learn how to lock hospital beds in the lowest position to reduce the likelihood of injury if a newborn were to fall from the bed. The American Academy of Pediatrics publishes and regularly updates recommendations for safe sleep practices to prevent sleep-related deaths among infants.²⁰ Several safe sleep practices that should be implemented in the hospital following birth include placing newborns on their back to sleep; using a firm sleep surface; and removal of all soft objects, including bedding, from the newborn's sleep area.

Dixon said that all staff on the maternity unit, including nurses and physicians, are conscientious about intervening when they see an unsafe situation. Within their hospital, staff on the maternity unit have received recognition for good catches to prevent newborn falls. Dixon shared that her facility has not experienced any newborn falls since implementation of these newborn fall prevention strategies, which are summarized in Figure 6.

Risk Assessment

A safety advisory published by The Joint Commission (TJC) suggests that facilities develop an assessment

tool to identify those mothers and babies who are at highest risk of experiencing a newborn fall.¹ While most literature endorses a policy of educating all parents about the potential risks of newborn falls, TJC advises facilities to provide more education and support for parents and newborns who are at the highest risk, rather than taking a one-size-fits-all approach. High-risk situations that have been identified by reviewing newborn fall incidents include delivery (especially when the mother has lost a significant amount of blood) and transport (when a caregiver has the potential to trip and fall), as well as more broadly during the postpartum period (when parental fatigue is at its peak).⁷ Additional research is needed to develop reliable assessment tools to prevent newborn falls in the future.

Limitations

Despite mandatory event-reporting laws in Pennsylvania, PA-PSRS data are subject to the limitations of self-reporting; it is not possible to draw conclusions about changes in the actual rates of newborn falls. Reports have increased compared to our previous analysis, both in the raw numbers and the percentage of Serious Events among all newborn fall events in Pennsylvania. Upward trends in the data may simply highlight an increasing awareness about the risk of newborn falls in facilities across our state.

Conclusion

Based on events reported to PA-PSRS from 2014 to 2018, it is evident that newborn falls continue to occur in healthcare facilities across Pennsylvania despite increased awareness of the issue in recent years. To reduce the possibility of newborn falls, recognition of the potential for these events should be increased in maternity units, and education should target both new parents and hospital staff alike. Because the primary contributing factor cited in more than half of newborn fall events reports in PA-PSRS is a caregiver falling asleep, facilities should focus their efforts on providing support for exhausted new mothers and fathers during the critical hours and days following the birth of a child, by offering periods of rest for new parents whenever they are tired, by increasing the frequency of rounding when new mothers are breastfeeding, and by promoting a break in visiting hours midday. In cases where a newborn fall event does occur, facilities should provide support to both injured newborns and any caregivers involved. In many cases, parents and other caregivers may benefit from counseling to help them better navigate the emotional turmoil that often follows these events.

Figure 6. Newborn Fall Prevention Strategies



Improve Education on Newborn Safety and Safe Sleep

- Welcome letter for new parents
- Training for hospital staff, including nurses and physicians
- More signage throughout maternity ward



Support Rest Time for Parents, Especially Mothers

- Nurses offer to take baby to nursery whenever parents need a break
- Encourage a break in visiting hours from 2 p.m. to 4 p.m.



Promote Vigilance Among Hospital Staff to Monitor for Potential Hazards to Newborn Safety

- Round every 15 minutes when mother is breastfeeding
- Always keep bed locked at lowest position

Notes

This analysis was exempted from review by the Advarra Institutional Review Board.

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