Sudden Unexpected Death in Infancy.

SUDI: Comparison of neonatal and post-neonatal deaths Queensland Australia

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Queensland Government
Queensland Paediatric Quality Council

Background

- The rate of SUDI including Sudden Infant Death Syndrome (SIDS) has plateaued in Queensland and Australia, following initial rate reductions after safe sleeping campaigns in the 1990s.[1]
- International comparisons are hampered by definitional differences. SIDS rates have decreased; SUDIs classified as "undetermined" or "accidental suffocation" have increased.[2] There are between-country differences as to whether neonates are included and if so, whether from birth or from 1 week of age.
- The peak age for SUDI occurs soon after the transition from neonatal to post-neonatal age. Neonates are reported as an increasing proportion of SUDI following the safe sleeping campaigns; this has been demonstrated as related to the fall in the SUDI rate in the post-neonatal age group.[2] Reports from the UK and USA that the median age of SUDI has fallen, led us to compare deaths at different infant age groups.[2,3]
- The Triple Risk Model posits a "critical developmental period" for SIDS.[4] We focussed on infant sleeping circumstances, and considered SUDI cases with regard to infant development stages (head control, crying, rolling) and mother / carer interventions in response, as these relate to infant age.

Aims

- Review SUDI to identify trends and relate these to milestones in development including sleep, peak crying (at 6-8 weeks), and rolling prone to supine (at approximately 6-7 months).
- Determine if there are different opportunities for prevention at different infant developmental ages.

Methods

Relevant health records for the infant, mother's birth record, autopsy reports, police death scene investigations and coroner reports were obtained.

A Data Collection Tool was developed to systematically analyse record content.

Case reviews were undertaken by an expert panel with experience in paediatrics and paediatric sub-specialties, child health, nursing, midwifery and neonatal nursing, child protection, and forensic and anatomical pathology. Two reviewers per case with group discussion and consensus.

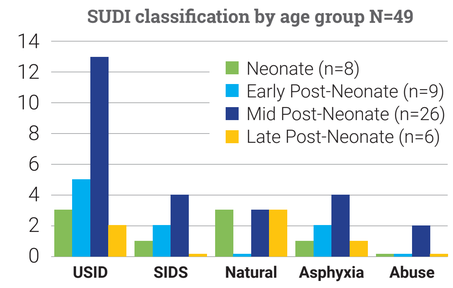
Quantitative data analysis was undertaken using REDCap™ and qualitative data were thematically analysed.

- QPQC conducted a retrospective multi-record review of all post-neonatal infant deaths in Queensland in 2013. Included in this review was a subgroup of neonates identified by ICD-10 code as having died suddenly and unexpectedly after discharge from birth hospital.
- The San Diego classification was used to define cause of death as "explained ", SIDS or USID (Unclassified Sudden Infant Death).[5]
- This work was supported by a funding grant from the Clinical Excellence Division. The documents were obtained in accordance with legislation supporting QPQC as a Quality Assurance Committee. An Ethics Waiver was approved by the Children's Health Queensland Health Research Ethics Committee

Results 1 Screening infant deaths for SUDI

- 99 infant deaths were identified; 90 post-neonatal infant deaths and 9 neonatal deaths. The deaths were categorized as either SUDI or non-SUDI. 51 deaths met the definition of SUDI.
- Cases were stratified by age as neonatal (0-27 days age at death), early post-neonatal (28-<56 days), mid post-neonatal (2-<6 months) and late post-neonatal (6-<12months).
- 2 SUDI case documents were not released by the Coroner (1 neonate, 1 early post-neonate).

49 SUDI had all documents available for review

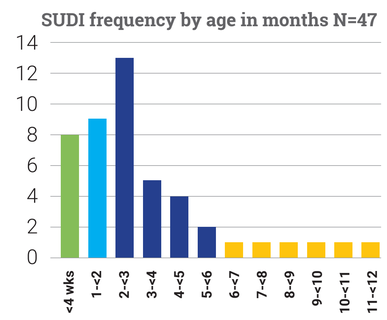


30 SUDI were unexplained (SIDS/USID) most often for early and mid post-neonate ages.

17 explained SUDI (9 natural cause, 8 asphyxia) were included as sleep circumstances may be relevant.

2 SUDI due to fatal abusive injury were excluded as unrelated to sleep circumstances.

47 SUDI were included in this review



8 neonate (17%), 39 post-neonate; 9 early, 24 mid, 6 late.

Where SUDI occurs, family vulnerabilities included the following

31 pre- or post-natal exposure to smoking
21 family known to child protection services
19 carer prescription sedatives/excess alcohol/illicit drugs
17 accessed services for mental health
11 Infants of Aboriginal and/or Torres Strait Islander descent

Results 2 SUDI analysis n=47 Sleep details

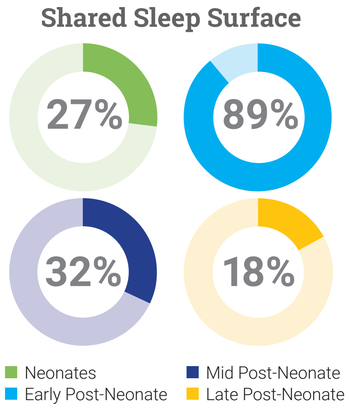
39 (83%) SUDI occurred in infant sleep: 31 night sleep, 8 day sleep, 5 not asleep, 3 uncertain if asleep.

9 (19%) SUDI occurred when mother fell asleep while feeding infant: 2 on bed, 3 on mattress, 3 sofa, 1 recliner.
1 neonate, 6 early post-neonate, 2 mid post-neonate.

2 SUDI occurred in infant slings.

39 SUDI occurred during infant sleep or in the sleep environment

19 (49%) shared a sleep surface: 2 neonate, 8 early post neonate, 8 mid, 1 late; 16 shared with a smoker.



Adult bed
n=12
7 shared
8 with pillows / soft bedding
most often 7 mid post-neonates, only 1 neonate

Mattress on the floor
n=9
9 shared (all)
8 with pillows / soft bedding
most often 3 early post-neon, 4 mid, 1 neonate

Sofa, recliner or sofa cushion
n=5
3 sofa (2 shared),
1 recliner (shared),
1 improvised sofa cushion alone
4 of these were used when feeding infant

Infant specific bedding
(eg cot, crib, porta cot)
n=11
(6 cot, 5 porta cot)
7 unsafe with added pillow / antiroll / soft bedding
only used for 1 early post- neonate
(2 other – 1 pram, 1 improvised baby bath)

Infant position – how placed to sleep (or held) and how found

16 had a reported change in position from placed to found, despite 12 unable to roll (<5 months age).

7 placed prone
0 neonate or early,
6 mid post-neonate,
1 late post-neonate.
6 found prone

PLACED ▸ / FOUND ▾	prone	side	supine	in arms	propped	unknown	in sling	not asleep
prone	●●●●●●	●	●●●●●●●		●			
side	●	●	●●	●●				
supine			●●●●●●●●	●	●	●		
in arms				●●●		●		
propped								
unknown				●		●●		
in sling							●●	
under mother						●		
not asleep								●●●●●

17 placed supine
4 neonate
2 early post-neonate
10 mid post-neonate
1 later post-neonate
7 found prone

Conclusions

- All SUDI occurred in the setting of an unsafe sleep environment. Many occurred in unsafe adult sleep surfaces, shared with carers with high rates of smoking and substance abuse. Infants died in unsafe cots, informal sleep surfaces, or in an asleep-mother's arms either sleeping or feeding.
- Sleep practices for neonate SUDI were safer; more placed and found supine, fewer sharing a sleep surface. Sleep practices for early post-neonate SUDI were most unsafe; almost all shared unsafe sleep surfaces. Sleep practices for mid post-neonate SUDI were unsafe with recurring themes of prone placement and shared unsafe sleep surfaces. Although older infants in this group have good head control and some may learn to roll early, most will be unable to correct an obstructed airway position in sleep until >6 months age at least. Parent-reported infant sleeping posture was not reliable; repeatedly a reported position change from "placed" to "found" was incompatible with the infant's developmental age, being too young to roll.
- The critical developmental period of the Triple Risk Model presents a paradox; an infant of post-neonatal age is biologically more robust than a neonate, yet the SIDS / SUDI rate in neonates is low. Infant development after the first few weeks (crying more, sleeping and self-settling less), and perhaps carer fatigue, are likely to influence carers to seek new strategies to enhance infant settling and feeding, such as inadvertently sharing unsafe sleep surfaces, thus moving away from safer sleep practices used in the first few weeks of infant life.
- Risk minimization approaches to bed sharing acknowledge that the practice is widespread and culturally valued. These may provide parents with strategies to keep their infant safe as they make choices for infant feeding and sleeping during early infant development.

Key Message
Unsafe sleep factors were universal and multiple

Key Message
Consider risk minimization approaches to bed sharing

Acknowledgements

- QPQC acknowledges that the death of an infant is a tragic loss for family and community. Our conviction that further deaths may be avoided by addressing modifiable risk factors, is the motivation for this work.
- Our other acknowledgements include the work of the volunteer expert panel, the cooperation of data custodians including the Queensland Health Statistics Unit, Forensic and Scientific Services, and Hospital and Health Services, the support of Children's Health Queensland Hospital and Health Service, and the Clinical Excellence Division of Queensland Health.
- Queensland Paediatric Quality Council QPQC. https://www.childrens.health.qld.gov.au/chq/health-professionals/qpqc/

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