Research Report
September 2006

Wrapping and Swaddling Infants:
Nurses’ Knowledge, Attitudes and Practices

Main Study Findings
Recommendations & Policy changes

Royal Children’s Hospital Foundation (RCHF Grant No: 914-046)

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1.0 PROJECT DETAILS

TITLE
Wrapping and swaddling infants: nurses’ knowledge, attitudes and practices.

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Consultant Statistician: Dr Robert Ware, Consultant Statistician, School of Population Health, University of Queensland

PARTICIPATING CENTRES
Community Child Health Centres in South Eastern Queensland in the following health service districts:
Royal Children’s Hospital Health Service District
Gold Coast Health Service District
Sunshine Coast Health Service District
Bayside Health Service District
QEII Hospital Health Service District
West Moreton Health Service District
Logan Beaudesert Health Service District
Toowoomba Health Services District
Redcliffe Caboolture Health Service District

PROJECT TIMELINES
Project commencement date: 1st January 2005
Project completion date: 31st March 2006

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2.0 EXECUTIVE SUMMARY

Background
Managing unsettled infant behaviour, promoting infant sleep and encouraging and supporting safe sleeping practices are issues routinely addressed by child health nurses working with parents of young infants. Recent studies have supported wrapping and/or swaddling as a strategy to calm infants, improve settling and promote supine sleep consistent with Safe Sleeping and Reduce the Risk of Sudden Infant Death Syndrome public health recommendations. In Queensland 12% of babies are routinely placed prone to sleep at 3 months of age rather than in the recommended supine sleeping position. Infant wrapping may be underutilised by parents and health professionals as a strategy to support supine positioning for infants as an alternative to prone positioning.

Aims
The purpose of this study was to 1) identify knowledge, attitudes and practices of child health nurses relating to infant wrapping; 2) reinforce the importance of the supine sleep position for infants by offering parents wrapping as a safe, effective settling/sleep strategy, as an alternative to prone positioning.

Methods
A pre-test/post-test intervention design was conducted in three phases to explore knowledge, attitudes and practices relating to wrapping in a sample of child health nurses (n=182): a) pre-test survey; b) educational intervention; c) post-test survey to evaluate intervention effectiveness.

Results
Pre-test results identified wide variation in child health nurses’ knowledge, attitudes and practices to wrapping infants as a settling/sleep strategy. The intervention increased awareness of infant wrapping guidelines and self-reported practices relating to parent advice. Significant positive changes in nurses’ awareness of wrapping guidelines (p<0.01); to wrap in the supine position only (p<0.01); and parental advice to use wrapping as an alternative strategy to prone positioning to assist settling/sleep (p<0.0001), were achieved post-test.

Conclusion
Evidence-based practice guidelines relating to infant wrapping were needed by nurses to assist parents to effectively manage infant settling/sleep issues. Infant wrapping guidelines are now included in Queensland Health’s state policy and minimum practice guidelines; the newly revised state-wide maternity and neonatal clinical pathways; national SIDSandKids information relating to safe infant sleeping; Certificate IV in Aboriginal & Torres Strait Islander Child and Youth Health and revision of Child and Youth Health Manual as a direct result of collaborations between the research team and government and non-government organisations involved in infant care policy. Child health nurses have a key role in reinforcing safe sleeping recommendations and offering parents safe, effective settling/sleep strategies to address the current high incidence of prone sleeping in Queensland infants.
3.0 BACKGROUND

Swaddling infants is an ancient practice that traditionally describes the tight wrapping of infants to restrict movement (van Gestel et al 2002) and was an almost universal practice before the 18th century (Lipton et al 1965). Swaddling remains a common cultural infant care practice in many countries including Asia, Turkey, the Middle East, South America, Eastern Europe and Canada (van Sleuwan 2003, Yurdakok et al 1990, Wilson 2000). Although there are many cultural variations in techniques used, all forms of swaddling have in common some degree of restriction of movement. Swaddling is normally used in conjunction with supine sleeping. In Australia the term ‘wrapping’ has been used to describe a more modern approach to restricting the movement of infants, and is a practice primarily employed to address unsettled infant behaviour and poor sleeping patterns. For the purpose of this report the expression ‘wrapping and/or swaddling” is used.

Benefits and concerns

Early studies found swaddling had a calming effect on infants, reduced crying and promoted better sleep patterns (Lipton et al 1965, Giacoman 1971). These findings have been supported by more recent studies (Caglayan et al 1991; Gerard et al 2002a; Renfrew et al. 2000). Experimental and observational studies of infant swaddling report further beneficial effects including decreased spontaneous arousal and startling in quiet sleep (including random arm movements) and increased duration of rapid eye movement sleep (Gerard et al 2002b); reduction of physiological and behavioural stress caused by acute pain (Geyer et al et al 2002; Huang et al 2004; Mitchell et al 2000); reduction in excessive crying (Long & Johnson 2001; Ohgi et al 2004) especially in drug exposed infants (Saylor et al 1991); the promotion of infant physiological and behavioural organisation (Ohgi et al, 2004, Neu Brown 2002, Gates Campos 1998); assistance in neuromuscular development in premature infants (Short et al 1996; Symington and Pinelli 2003); and the promotion of the supine sleep position in accordance with Safe Sleeping and reducing the risk of SIDS recommendations (Gerard et al 2002a; van Sleuwen et al 2003; Manaseki-Holland et al 2005). Controversy surrounding swaddling infants for sleep relates to concerns about possible negative health outcomes related to restrictive swaddling; and include respiratory (Yurdakok et al 1990), overheating (Nelson et al 1989; Bacon et al 1991; van Gestel et al 2002), and orthopaedic issues (Kutlu et al 1992; Sahin et al 2004). Restricted hip movement may lead to developmental dysplasia (Kutlu et al 1992).

SIDS and prone sleeping

Prone sleeping has been identified as a major modifiable risk factor for Sudden Infant Death Syndrome (SIDS) as it has been demonstrated to significantly increase the risk of SIDS (AAP 2005; PHAA 2005). A meta-analysis of 19 retrospective case-control studies demonstrated an almost three-fold increased risk of SIDS associated with infants sleeping in the prone position (overall Odds Ratio of 2.72, with individual studies yielding much higher OR of up to 10 (Beal &
Finch 1991; Sullivan & Barlow, 2001; NICS 2005; Blair et al 2006). The major international success in the reduction of SIDS through public awareness campaigns in most countries (estimated at 70% in Australia) has been attributed to the recognition of the prone sleep position as a major risk factor (NICS 2005; Fleming et al 2000; Blair et al 2006). Several studies have also demonstrated that infants unaccustomed to the prone position, and placed prone for sleep, were at a greater risk of SIDS than infants usually placed prone (Mitchell et al 1997; Li et al 2003). These findings emphasise the importance of every caregiver using the back sleep position during every sleep period, particularly when the infant’s accustomed position is supine (AAP 2005).

Recent research has identified that 12% of Queensland parents and/or primary caregivers are settling their three month old infants to sleep in the prone position (Young et al 2004). Motivating factors for parents who choose to settle their infant prone is that the infant appears to be more comfortable and to sleep better (Willinger et al 2000). Wrapping and/or swaddling in the supine position has been shown to calm infants and to improve settling to sleep (Gerard et al 2002a), as well as reduce the risk of SIDS by maintaining the infant in the supine position (Wilson et al 1994, Ponsonby et al, 1993, Gerard et al 2002a, 2002b). Wrapping and/or swaddling infants in the prone position, however, is associated with an increased risk of SIDS (Ponsonby et al 1993).

Child health nurses as parent educators
Child health nurses are involved in the care of families with young infants and are an important source of advice regarding sleeping and settling strategies for parents. The problems that parents of young infants experience with managing unsettled infant behaviour, excessive crying and promoting improved sleep patterns and practices for infants are issues routinely addressed by community child health nurses.

The clinical pathway for settling infants under six months in use at the Riverton Early Parenting Centre was revised to accommodate increased parent involvement with decision-making regarding settling management for infants aged less than three months. The calming/settling strategy of wrapping and/or swaddling was included as an alternative strategy to offer to parents for this young age group. It became apparent that there were differing opinions among staff as to the suitability of offering wrapping and/or swaddling as a settling strategy to parents. There appeared to be a similar mixed response to wrapping and/or swaddling by child health nurses working in community child health centres in the Royal Children’s Hospital and Health Service District (RCH&HSD).

Pilot Study
A pilot study of child health nurses’ knowledge, attitudes and practices related to swaddling (n=24) identified knowledge, attitude and practice deficits regarding safe wrapping and/or swaddling techniques. These initial findings reinforced the need for further investigation and
clarification of nurses’ response to wrapping and/or swaddling and highlighted the need for an educational intervention which examined this subject from an evidence-based practice perspective. The pilot study also identified a need for clear guidelines on safe wrapping and/or swaddling techniques for health professionals working with parents to ensure that parent advice relating to this intervention is safe, effective and consistent.

4.0 AIMS

The primary aims of this study were to

1. identify the current knowledge, attitudes and practices of child health nurses in south east Queensland in relation to wrapping and/or swaddling infants;
2. develop consistent and evidence-based strategies to assist parents to cope with unsettled infant behaviour and poor sleeping patterns;
3. reinforce the importance of the supine sleeping position for infants;
4. develop clear guidelines for child health nurses regarding the appropriate use of, and safe techniques for, wrapping and/or swaddling infants.

4.1 RESEARCH QUESTIONS

This study addressed the following specific research questions:

1. Are child health nurses aware of, and in agreement with, current factual literature and recommendations relating to infant wrapping and/or swaddling as an infant settling and sleep strategy?
2. What is the current practice of nurses relating to infant wrapping and/or swaddling?
3. What reasons are identified for discrepancies between practice and current recommendations?
4. Which areas require improvement in current practice?
5. Evaluate the extent to which wrapping and/or sleep strategies are incorporated into current nursing practice.
6. Will an educational intervention relating to infant wrapping and/or swaddling, including the use of an educational resource on infant wrapping and/or swaddling appropriate for the Queensland environment positively impact on a) knowledge about wrapping and/or swaddling strategies?; b) attitudes towards wrapping and/or swaddling practices?; c) practices relating to wrapping and/or swaddling strategies?; d) consistency in approach to wrapping and/or swaddling strategies?
5.0 MAIN STUDY

5.1 STUDY DESIGN

A pre-test/post-test intervention design was used to explore nursing knowledge, attitudes and practices relating to wrapping and/or swaddling as an effective infant calming, settling and sleep strategy.

5.2 DEVELOPMENT OF THE SURVEY INSTRUMENT TOOL

Following a review of the literature and in consultation with an expert panel to establish content validity, a survey tool was developed for the purpose of the study to determine nurses' knowledge, attitudes and practices in relationship to wrapping and/or swaddling infants. The survey comprised 2 parts that took approximately 10 minutes of the participant's own time to complete:

a) **Demographic data section:** This section asked for information that could potentially influence responses including post registration qualifications and how long they had worked in a setting that involved contact with parents of young infants.

b) **Knowledge, attitudes and practice section:** This section comprised questions to test current knowledge of the practice of wrapping and/or swaddling infants including the current SIDS and Kids position of this practice. Also included in this section were questions that evaluated attitudes regarding wrapping and/or swaddling and related to individual practices. To assess participant’s knowledge, attitudes and practices of wrapping and/or swaddling infants, questions were formatted using multiple choice and one short answer format.

5.3 SAMPLE and JUSTIFICATION OF SAMPLE SIZE

We limited the target population to south east Queensland in keeping with time and financial resources available. This defined region included a sample of 181 child health nurses working in nine health service districts. These districts included the Royal Children’s Hospital & HSD; Redcliffe/Caboolture; Logan; QEII; Bayside; West Moreton; Sunshine Coast; Gold Coast and Toowoomba.
5.4 INCLUSION AND EXCLUSION CRITERIA

Specific inclusion criteria included:
- Participants must be registered nurses;
- Participants must have full time, part time or casual nursing employment at the study sites;
- Participants must be primarily in a child health nursing role;
- Participants must be conversant in English to be able to complete the survey that will be in English.

NB: It was highly unlikely that registered nurses currently employed within Queensland Health would be non-English speaking (as command of the English language is a prerequisite for nurse registration in Queensland). Therefore, although not actively excluded, if staff members were not conversant in English they would not have been able to complete and return the survey form. As a result, non English speaking subjects will probably not participate as members of the sample group.

Specific exclusion criteria included:
- Registered nurses not working in child health.
- Registered nurses who were not currently employed full-time, part-time or casually at the study sites.

5.5 VOLUNTARY PARTICIPATION AND CONSENT

A plain language information sheet that accompanied the questionnaire given to each participant in each phase informed the subject that their participation was voluntary and that they were free to withdraw from the study at any time without comment or penalty. It was explained that non participation in this study would not affect staff members in any way. The return of a completed survey was taken as an indication of staff consent to participate in the study. Phone numbers of both researchers, and the Chair of the Royal Children’s Hospital & District Health Service Ethics Committee, were included in the information sheet and were provided to the participants during all phases of the study should they require further information about the project or were concerned about the ethical conduct of the study.

5.6 METHODOLOGY

This study was conducted in three phases:
- **Phase 1**: A pre-test survey to identify gaps in knowledge of swaddling and/or wrapping practices.
- **Phase 2**: Development of an educational intervention and resource material offered as in-service for nursing staff informed by pre-test survey results.
- **Phase 3**: A post-test survey was conducted to evaluate the effectiveness of the intervention.
5.6.1 DATA COLLECTION

Phase 1: Pre-test Staff Survey
The researchers identified participants meeting the inclusion criteria in liaison with the nurse managers from each of the nine participating health districts. The survey form, participant information sheet and reply paid envelope were distributed to participants (excluding participants from the Riverton Early Parenting Centre) in Phases 1 and 3. Participants at the Riverton Early Parenting Centre were asked to return the survey to a sealed box located in the Child Health Line area located within the Riverton Centre or by reply paid envelope. The survey took approximately ten minutes of the participant’s own time to complete.

Reminders: Reminders to complete the questionnaire were given in staff meetings and through liaison of the researchers with departmental managers. A letter explaining the follow up process, and a second information sheet and survey were sent to each participant who did not return the survey within four weeks of receiving the first survey.

Phase 2: Educational Intervention Period
Phase 2 involved the development and implementation of an educational intervention designed to address knowledge, attitudes and practices and would provide an evidence-based resource to positively impact nursing practice and parent advice related to wrapping and/or swaddling of infants.

Educational Intervention: The intervention took the form of a combined didactic and discussion forum supported by an overhead or power point presentation. Educational resource pamphlets, journal abstracts and a practical demonstration of the principles of safe infant wrapping and/or swaddling techniques accompanied the presentation and discussion. Content of the presentations included dissemination of pre test survey results and discussion of identified areas of knowledge deficit regarding wrapping and/or swaddling infants from an evidence-based perspective. Safe wrapping and/or swaddling techniques, as recommended by SIDS and Kids Australia, were demonstrated with a life-sized doll. Existing in-service education group meetings and staff meetings were utilised to conduct the educational intervention within each of the nine Health Service Districts.

Phase 3 Post-test: Staff Survey post Intervention
A post test staff survey was conducted six weeks following the Phase 2 educational intervention in each Health Service District. The survey form (identical in content to the pre-test), information sheet and reply paid envelope were disseminated to participants utilising the same methods as Phase 1. Participants were requested to return the survey similarly to Phase 1 and the reminder process was repeated.
5.7 DATA MANAGEMENT

5.7.1 STATISTICAL ANALYSES

Medians, inter-quartile ranges (IQR), frequencies and percentages were used to report the central tendency, spread and empirical distributions of the categorical variables. All bivariate comparisons of categorical frequencies were undertaken using Fisher's exact or Chi-squared tests, while McNemar's test was used to detect differences between participants' pretest and post-test responses (Kirkwood 1990) for the subgroup who had completed both pre and post test surveys. Statistical computations were conducted using the SPSS statistical software packages (SPSS Inc. 2001). An $\alpha$-level of 5% was considered statistically significant for all comparisons.

5.7.2 DATA IDENTIFICATION AND STORAGE

Questionnaires for each participant were identified using study code numbers and this number was used in entering data and enabling reminders to be sent to those nurses who did not respond in the initial survey distribution. Information was not displayed in a way that allowed any individual or group involved in the study to be identified. All information, including records of identification numbers and completed surveys have been kept in the strictest confidence in a locked filing cabinet, accessible only to the researchers. Records linking identification numbers to individual participants have been destroyed as per NH&MRC ethical guidelines.

5.8 ETHICAL APPROVAL

Ethical approval to conduct this study was obtained prior to commencement from the Queensland Health Central Office Human Research Ethics Committee and was registered with the Queensland Health Research Registry (Promart Research Registry No. 515). Ethics approval was also sought and obtained from each of the participating Health Service District human ethics committees:

- Royal Children's Hospital & District Health Service Ethics Committee
- Royal Women's Hospital Human Research Ethics Committee
- Redcliffe – Caboolture Health Service District Ethics Committee
- Bayside Health Service District Human Research Ethics Committee
- Gold Coast Health Service District Human Research Ethics Committee
- West Moreton Health Service District Human Research Ethics Committee
- Princess Alexandra Hospital Human Research Ethics Committee
- Toowoomba Health Service District Human Research Ethics Committee
- QEII Hospital Health Service District Human Research Ethics Committee
6.0 RESULTS

The main study results will be presented in this report of main study findings, recommendations and policy changes. A detailed report of study results, addressing each survey question and resultant pre/post change in knowledge, attitudes and practices is available from the authors upon request.

6.1 RESPONSE RATE

The survey response rate for Phase 1 was 86% with 155 of 181 surveys completed and returned. Of the target population of 181 nurses, 118 (64%) nurses attended the in-service sessions during Phase 2. Phase 3 achieved a response rate of 74% with 129 of 175 surveys returned.

6.2 DEMOGRAPHICS

The demographic characteristics of the nurses who participated in the study are presented in Tables 1 and 2.

All participants were female and employed on a part-time (72, 46%), full-time (69, 45%) or casual (13, 8%) basis. Most nurses were 35-54 years of age (99, 64%); held Nursing Officer positions at level NO2 or above (120, 77%); had been working with parents of young children for 10 years or more (122, 78%); held a child health qualification (145, 94%) and were currently involved in parent education (153, 99%).

6.3 KNOWLEDGE, ATTITUDES AND PRACTICES

Pre-test results identified a wide variation in child health nurses’ knowledge, attitudes and practices relating to infant wrapping as a settling and/or sleep strategy. Most nurses (117, 75%) advocated wrapping as a settling/sleep strategy; while 113 (74%) indicated that they were aware of the difference between safe and unsafe wrapping techniques; 15 (10%) nurses were not aware and 25 (16%) were unsure of differences. [No description of ‘safe’ and ‘unsafe’ wrapping and/or swaddling techniques was provided in the survey to prompt participants]. Despite more nurses advocating wrapping and most stating they were aware of safe and unsafe practices, less than half the respondents (73, 47%) were aware of the current SIDS and Kids recommendations relating to safe wrapping practices for infants. Less than a third (49, 31%) acknowledged infant wrapping as a strategy to support the use of supine sleep, with almost a third of nurses (50, 32%) indicating that they would not recommend wrapping in the supine position as an alternative settling strategy to parents who were choosing to settle their 2 month old infant prone.
Table 1: Demographic and employment characteristics of child health nurses in the sample (n=155)

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>number</th>
<th>(%)</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>155</td>
<td>(100)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 – 34 years</td>
<td>9</td>
<td>(5.8)</td>
</tr>
<tr>
<td>35 – 44 years</td>
<td>45</td>
<td>(29)</td>
</tr>
<tr>
<td>45 – 54 years</td>
<td>66</td>
<td>(43.1)</td>
</tr>
<tr>
<td>&gt; 55 years</td>
<td>33</td>
<td>(21.3)</td>
</tr>
<tr>
<td>Total</td>
<td>153</td>
<td>(98.7)</td>
</tr>
<tr>
<td>Cultural background of participants</td>
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<tr>
<td>Australian</td>
<td>133</td>
<td>(85.8)</td>
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<tr>
<td>British</td>
<td>12</td>
<td>(7.7)</td>
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<tr>
<td>European</td>
<td>4</td>
<td>(2.6)</td>
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<td>African</td>
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<td>(3.2)</td>
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<tr>
<td>Other</td>
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<td>(0.6)</td>
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<tr>
<td>Employment status</td>
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<tr>
<td>Full-time</td>
<td>69</td>
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<tr>
<td>Part-time</td>
<td>72</td>
<td>(46.5)</td>
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<tr>
<td>Casual</td>
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<td>(8.4)</td>
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<tr>
<td>Position Description</td>
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<tr>
<td>Registered Nurse</td>
<td>27</td>
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<tr>
<td>Clinical Nurse</td>
<td>112</td>
<td>(72.3)</td>
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<td>Clinical Nurse Consultant</td>
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<td>(3.2)</td>
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<tr>
<td>Nurse Unit Manager</td>
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<tr>
<td>Enrolled /Mothercraft Nurse</td>
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<td>(1.9)</td>
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<tr>
<td>Highest level of education completed</td>
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<tr>
<td>Post - Registration Certificate</td>
<td>51</td>
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<td>Diploma/Degree</td>
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<td>Post Graduate Certificate</td>
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<td>Postgraduate Diploma</td>
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<td>Masters</td>
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<td>(1.9)</td>
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<tr>
<td>Enrolled Nurse/ Mothercraft Certificate</td>
<td>3</td>
<td>(1.9)</td>
</tr>
<tr>
<td>Family Planning qualification</td>
<td>1</td>
<td>(0.6)</td>
</tr>
</tbody>
</table>
Table 2: Demographic characteristics relating to professional experience and qualifications of child health nurses in the sample

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>number</th>
<th>(%)</th>
</tr>
</thead>
</table>
| **Post-registration experience (years)**
  0–4                                                        | 2      | (1.2)|
  5–9                                                        | 15     | (8.3)|
  10–19                                                      | 43     | (27.7)|
  20+                                                       | 91     | (58.2)|
| **Length of time in current position (months)**
  <6                                                         | 11     | (7.1)|
  6 months to < 1 year                                      | 8      | (5.2)|
  1 year to < 2 years                                       | 16     | (10.3)|
  2 years to < 5 years                                      | 37     | (23.9)|
  5 years or more                                           | 81     | (52.3)|
| **Current practice area**
  Child Health Clinic                                        | 77     | (49.7)|
  Home visiting                                             | 37     | (23.9)|
  Parent Management Clinic                                   | 5      | (3.2)|
  Parent Education Groups                                    | 16     | (10.3)|
  Early Feeding Clinic                                       | 6      | (3.9)|
  Residential Centre                                         | 33     | (21.3)|
  Child Health Line                                          | 8      | (5.2)|
  Intensive Parenting Education                              | 2      | (1.3)|
  Nursing Management                                         | 5      | (3.2)|
| **Involvement in parent education**
  Yes                                                        | 153    | (98.7)|
  No                                                         | 2      | (1.3)|
| **Length of time working in a setting that involves contact with parents of young children**
  0–4                                                        | 4      | (2.5)|
  5–9                                                        | 27     | (17.3)|
  10–19                                                      | 68     | (43.8)|
  20+                                                       | 54     | (34.5)|
| **Specialty professional qualifications**†
  Midwifery endorsement                                     | 126    | (81.3)|
  Paediatric qualification                                  | 20     | (12.9)|
  Mental Health qualification                               | 5      | (3.2)|
  IBCLC: lactation consultant                               | 36     | (23.2)|
  Neonatal qualification                                    | 8      | (5.2)|
  Child Health qualification                                | 145    | (93.5)|
  Immunisation qualification                                | 7      | (4.5)|
  Health promotion                                           | 6      | (3.9)|
  Community Health qualification                            | 2      | (1.3)|
  Continence qualification                                  | 1      | (0.6)|
  Management/Business qualification                          | 3      | (1.9)|
  Family Planning qualification                             | 1      | (0.6)|
Most nurses 90 (58%) first became aware of wrapping during their midwifery practice. A considerable proportion identified that they had first become aware of the practice of wrapping by use within their own family (29, 19%) or when they first began in the child health environment (20, 13%). Fewer (9, 6%) nurses became aware of wrapping strategies during their paediatric nursing practice (9, 6%).

Over half the respondents (87, 56%) acknowledged that they were from a culture that did not traditionally practice wrapping and/or swaddling infants in the home while 51(32%) nurses identified that wrapping and/or swaddling was traditionally practiced in their home.

6.3.1 Positive effects of wrapping

Figure 1 illustrates nurse attitudes relating to situations where wrapping may be positive benefits comparing pre-test and post-test responses. [Pre post changes are reported using paired data for nurses who completed both pre and post test surveys]. The majority of nurses were of the opinion that wrapping and/or swaddling increases feelings of security (137, 88%), is calming (127, 81%), reduces the startle reflex (118, 76%), improves settling to sleep (110, 71%) and increases the duration of sleep (80, 51%). Fewer nurses believed that wrapping and/or swaddling reduces crying (51, 32%) or reduces colic symptoms (16, 10%). Only a few nurses (15, 9%) were aware that wrapping and/or swaddling can improve development in premature infants. Other opinions regarding the positive effects of wrapping and/or swaddling on infants included helping to establish routine (1, 1%) and reduces uncontrolled movement (1, 1%). Nurses’ knowledge of the potential positive effects of wrapping improved post test for each effect.

Figure 1: Comparison of pre test & post test responses relating to knowledge of positive effects of wrapping
6.3.2 Potential negative effects of wrapping

Nurses were asked what they thought the negative effects of wrapping and/or swaddling were (See Figure 2). Figure 2 illustrates nurse perceptions of the negative effects of wrapping. The main concern held by the majority of nurses was the risk of overheating (114, 73%). Other concerns included that wrapping and/or swaddling may lead to a sleep association (68, 43%); limit normal development (53, 34%); increase the risk of SIDS (42, 27%); compromise respiratory function (32, 20%); and increase the risk of suffocation or smothering (32, 20%). Very few nurses were aware that tight wrapping and/or swaddling may lead to hip dysplasia (8, 5%). There were 65 (41%) nurses who believed there were no negative effects if the infant was “safely” wrapped and/or swaddled. Positive changes in knowledge were achieved post test consistent with the evidence with significantly more nurses indicating that there were no negative effects of wrapping for the infant if the infant was safely wrapped (Pre post change, p<0.5) (See Figure 2).

Figure 2: Comparison of pre test & post test responses relating to knowledge of negative effects of wrapping

6.3.3 Does Queensland’s climate inhibit the use of wrapping?

Figure 3 shows pre test responses to the question of whether the Queensland climate inhibits the use of wrapping in infants. Most nurses answered that they believed the Queensland climate did not inhibit wrapping if the infant was lightly clothed in summer, a response consistent with the evidence. The vast majority of nurses correctly identified light cotton (145, 93%) and muslin (144, 92%) with a small percentage identifying flannelette blankets (25, 16%) and cotton air cell blankets (25, 16%) as suitable wrapping and/or swaddling materials. One nurse thought it was appropriate to use a woollen blanket for wrapping and/or swaddling.
When paired data was compared (see Figure 4) the educational intervention achieved a significant positive impact with more nurses indicating the correct response post test (66% Vs 80%, p=0.005).

Figure 4: Comparison of pre & post test correct responses (paired data): wrapping in Queensland climate

No, climate does not inhibit wrapping if infant clothed lightly in summer (correct response)
Pre post change, p=0.005
6.3.4 **Knowledge: Staff familiarity with safe and unsafe wrapping techniques**

Participants were asked if they were familiar with differences between safe and unsafe wrapping and swaddling practices. Prior to the intervention 113 participants (74%) said they were aware of safe and unsafe practices; post intervention this increased to 93%, achieving a significant positive change in nursing knowledge (pre post change, p=0.02). See Figure 5.

![Figure 5: Comparison of pre and post knowledge: Safe and unsafe wrapping techniques](image)

6.3.5 **SIDS&KIDS guidelines for parents choosing to wrap infant**

Participants were asked if a parent chooses to wrap their infant, what was their understanding of current SIDS and KIDS guidelines regarding this practice. Less than half the nurses (47%) indicated that they were aware that wrapping in the supine position was supported pretest with 29% of view that SIDS and KIDS did not support wrapping, and 20% were unsure of the guidelines. SIDS&KIDS recommendations relating to wrapping were areas that were addressed during the intervention. A significant change in knowledge post intervention was achieved relating to awareness of wrapping in the supine position is recommended, 47% to 84% (Pre post change, p<0.01), with significantly less nurses post test reporting that wrapping is not recommended (p<0.01) or that they were unsure of the guidelines (p<0.01).

![Figure 6: Pre and post test knowledge: SIDS&KIDS guidelines for parents choosing to wrap infant](image)
Pre and post test paired attitudinal responses: Situations in which wrapping can be useful

Figure 7 demonstrates participants’ responses to the question “In what situations do you think wrapping can be useful”. Most nurses felt wrapping was a useful strategy for managing unsettled infant behaviour (140, 90%) and infants who frequently startle (118, 76%); approximately half the sample indicated wrapping was useful for infants who frequently wake (84, 54%), for warmth (81, 52%), and for infants experiencing drug withdrawal (71, 46%). However, less than a third of nurses (49, 29%), identified wrapping as a strategy to promote supine sleep. Less than a quarter of the sample identified the situations of a colicky infant (38, 24%) and containing an infant’s hands while breastfeeding (36, 23%) where wrapping and/or swaddling can be useful. A few nurses thought wrapping and/or swaddling was not useful in any situation (3, 1%). Positive changes in nursing attitudes were achieved post-test with responses significantly more consistent with the evidence for the promotion of the supine position (p<0.0001); infants who frequently wake (p<0.001) or startle (p=0.0003); painful procedure management (p<0.001); infant drug withdrawal (p<0.0001) and babies with colic (p<0.001).

6.3.7 Support for evidence-based policy guidelines for infant wrapping

Prior to this study there were no official policy guidelines regarding wrapping in the participating health service districts, as correctly identified by the majority of participants (117, 76%), although a considerable proportion (25, 16%) were unsure. Both pre (128, 83%) and post test the majority of child health nurses felt that the development of evidence-based guidelines regarding wrapping and/or swaddling of infants would be useful in their workplace, and fewer were unsure about the need for evidence-based guidelines following the intervention; although the decrease was insignificant (p>0.05).
6.3.8 Use of wrapping as a calming/settling strategy in nurses’ practice

Despite of not being aware of policy guidelines, 82% of nurses pretest advocated the use of wrapping as a calming and settling strategy for infants and families in their care. This increased significantly post-test to 93% (Pre post change, p=0.0009).

Figure 9: Use of wrapping as a calming/settling strategy in nurses’ practice: pre & post comparison of paired responses

Diagram: Bar chart showing the percentage of participants who advocated the use of wrapping as a calming/settling strategy before and after the intervention. The chart shows a significant increase from pre to post-test (Pre post change, p=0.0009).
6.3.9 Wrapping discussion with parents of infants 0-3 months & infants 3-6 months:

When asked how often any aspect of wrapping was discussed with parents, nurses indicated that they were more likely to discuss the practice of wrapping with parents of infants less than 3 months of age. The intervention did not appear to impact practice significantly given the majority indicated this pre test. Following the intervention, significantly more nurses indicated that they had changed their practice and would sometimes or frequently discuss wrapping with parents of infants aged 3-6 months (p=0.0001) compared to never or rarely discussing this practice with parents.

Figure 10: Discuss wrapping with parents of infants 0-3 months & infants 3-6 months: comparison of pre & post test paired responses

6.3.10 Staff response to parent who chooses to wrap their infant

Participants were asked their response to a parent who chooses to wrap/swaddle their infant. Before the education session only 30% (n=65) of nurses indicated that they would have actively supported the parent’s decision to wrap their infant; 40% (n=65) would have suggested an alternative strategy and 9 nurses (5%) would have actively discourage the practice; suggesting that many child health nurses were previously not comfortable with wrapping infants to settle them. Most nurses (123, 79%) indicated that they would have discussed safe wrapping techniques while a smaller proportion (92, 59%) would have specifically discussed SIDS and Kids recommendations; an interesting finding given that only 73 (47%) nurses indicated that they were aware of SIDS and Kids recommendations. Post test, more nurses responses were consistent with support of wrapping as a strategy for parents to use, particularly in supporting the parents’ decision (30% Vs 48%, p=0.001) and in a significant reduction in the alternative settling strategies, including prone, that would be proposed (40% Vs 19%, p=0.002).
6.3.11 Parent advice relating to use of wrapping as alternative strategy to prone positioning

Participants were asked if a parent was choosing to settle a 2 month old infant prone would they recommend wrapping in the supine position as an alternative to the prone position. Despite the evidence, although most would recommend supine sleep with the infant wrapped (95, 62%) as an alternative to prone, almost a third of nurses (50, 32%) would not recommend wrapping to encourage supine sleep with 2 month old infants whose parents are choosing to settle them prone when those infants are in fact of the age when they are at greatest risk of SIDS; between 2-4 months. However post intervention, we achieved a significant positive change with child health nurses significantly more likely to indicate that they would recommend to parents to try wrapping as an alternative to the prone position, (62% Vs 86%, p=0.0001).

Figure 12: Wrapping discussion with parents of infants 0-3 months & infants 3-6 months: comparison of pre & post test paired responses

Would you recommend wrapping in supine as an alternative to prone?

at 2 months, p=0.0001

at 4 months, p<0.0001

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We were interested if this response was dependent on infant age. Participants were asked if an infant of 4 months of age was rolling to prone, would they suggest to a parent to trial wrapping as a strategy to keep the infant supine. See Figure 12. Most nurses (141, 91%) indicated that they would not suggest a trial of wrapping to parents as a strategy to keep a four month old infant who had just begun rolling, in the supine position; with only 8 (5%) nurses recommending wrapping as a suitable strategy and 6 (4%) nurses unsure. However the educational intervention was successful in achieving a significant positive change post test (5% to 41%, p<0.0001) with significantly more nurses (n=53) indicating that they would correctly recommend that parents try a trial of wrapping to encourage their baby to stay in the supine position during sleep. Half the respondents (63, 50%) still would not have recommended this strategy with a further 11 (9%) nurses unsure.

7.0 DISCUSSION

The study results will be briefly discussed in terms of the research questions originally posed. Research results will be discussed further in research papers currently being prepared for publication.

Are child health nurses aware of, and in agreement with, current factual literature and recommendations relating to infant wrapping and/or swaddling as an infant settling and sleep strategy?

Pre-test results identified a wide variation in child health nurses’ knowledge, attitudes and practices relating to infant wrapping as a settling and/or sleep strategy, and specifically as a strategy to encourage the public health recommendation of the supine sleep position for infants.

Prior to the intervention just over half the nurses (89, 57%) perceived there to be a difference between the terms wrapping and swaddling and provided the ‘preferred’ response that wrapping was cloth firmly folded around the infant (87, 56%). The majority of respondents (111, 72%) indicated that they preferred to use the term wrapping as opposed to swaddling in their practice, and this increased post test. Most nurses indicated that they were aware of safe and unsafe practices. However, less than half were aware of the current SIDS and Kids recommendations relating to safe wrapping practices for infants. Less than a third acknowledged infant wrapping as a strategy to support the use of supine sleep, with almost a third of nurses (32%) indicating that they would not recommend wrapping in the supine position as an alternative settling strategy to parents who were choosing to settle their 2 month old infant prone. Most nurses (>90%) were aware that light cotton and muslin wraps were appropriate materials to use for wrapping infants, both before and after the intervention. A third of respondents (33%) indicated before the
intervention that the Queensland climate inhibited the utilisation of wrapping as a strategy. Most nurses indicated that the first three months of an infant’s life was the age period that wrapping and/or swaddling was the most helpful.

**What is the current practice of nurses relating to infant wrapping and/or swaddling?**

The current SIDS and Kids recommendations for safe wrapping of infants are that the cloth be wrapped around the infant firmly; a variety of methods are advocated that allow hand to mouth infant behaviours or containment of the infant’s limbs.

Over half the respondents indicated that they used a wrapping style including the cloth firmly folded and then loosened as the infant physically develops to allow arm movement or the cloth firmly or tightly folded around the infant then gradually loosened before ceasing wrapping and/or swaddling. More than a quarter of nurses 41 (26%) preferred the cloth to be loosely folded around the infant; which is not recommended. A majority of nurses preferred the arms to be flexed and either loosely contained (59, 38%) or with hands free near the mouth (37, 23%). A few nurses (10, 6%) preferred the arms to be free of the wrap and/or swaddle while 16 (10%) preferred the arms to be contained and folded across the chest and 6 (3%) preferring to contain the arms along each side of the infant.

**Evaluate the extent to which wrapping and/or sleep strategies are incorporated into current nursing practice.**

Most nurses (117, 75%) advocated wrapping as a settling/sleep strategy in their practice while 21 (13%) nurses identified that they did not use this settling strategy. Most nurses (119, 77%) indicated that they would initiate the use of wrapping and/or swaddling in their practice at least sometimes or frequently. Approximately half the respondents discussed aspects of wrapping and swaddling frequently with parents of infants aged less than 3 months (50%) and parents of infants aged 3-6 months (47%). Most nurses indicated that if a parent chose to wrap their infant that they would discuss safe wrapping techniques (82%) but appeared to be less likely to indicate that they supported the parent’s decision (only 30% indicated that they would).

Participants were asked if a parent was choosing to settle a 2 month old infant would they recommend wrapping in the supine position as an alternative to the prone position. Despite the evidence, although most would recommend supine sleep with the infant wrapped as an alternative to prone, almost a third of nurses would not recommend wrapping to encourage supine sleep with 2 month old infants whose parents are choosing to settle them prone when those infants are in fact of the age when they are at greatest risk of SIDS; between 2-4 months. Participants were also asked if an infant of 4 months of age was rolling to prone, if they would...
suggest to a parent to trial wrapping as a strategy to keep the infant supine. Most nurses (141, 91%) indicated that they would not suggest a trial of wrapping to parents as a strategy to keep a four month old infant who had just begun rolling, in the supine position; with only 8 (5%) nurses recommending wrapping as a suitable strategy.

**What reasons are identified for discrepancies between practice and current recommendations?**

Prior to the intervention most nurses indicated that they were not aware of any Queensland health or District Policy guidelines regarding wrapping and/or swaddling in their workplace (76%) and a further 18% were unsure. The vast majority (92%) indicated that evidence based guidelines should be developed relating to the practice of wrapping and swaddling. Study results indicate that nurses may be more inclined to advocate an evidence-based practice such as safe wrapping of infants if policy guidelines endorsed by the organisation have been developed and implemented so that staff felt supported in their workplace.

**Which areas require improvement in current practice?**

The pretest results highlighted areas for improvements to be made in knowledge, attitudes and practices of child health nurses relating to the practice of wrapping infants, especially as a strategy to support the use of the supine position for infants 0-6 months of age. Knowledge areas included principles of safe wrapping, appropriate age for wrapping infants, positive and negative effects of wrapping infants, appropriate materials to use, and styles of wrapping. Practices areas included parent advice, support and frequency of education provision, particularly when wrapping can be used as a safe and effective strategy to assist settling and support the use of the safe infant supine position as alternative to prone, consistent with Safe Sleeping recommendations.

Of particular note was that despite the evidence, almost a third of nurses would not recommend wrapping to encourage supine sleep with 2 month old infants whose parents are choosing to settle them prone when those infants are in fact of the age when they are at greatest risk of SIDS, between 2-4 months. This finding supports our concern that part of the reason that Queensland has such a high incidence of prone sleeping at 3 months may be due to parents not having been encouraged by health professionals to trial other strategies such as wrapping as a supine settling and sleep strategy.
Will an educational intervention relating to infant wrapping and/or swaddling, including the use of an educational resource on infant wrapping and/or swaddling appropriate for the Queensland environment positively impact on

a) knowledge about wrapping and/or swaddling strategies?
Post-test results indicated positive significant impacts on nurses' knowledge and practices related to infant wrapping, the promotion of supine sleep and parent advice. Significant positive changes in nurses’ knowledge of safe wrapping techniques (p=0.02) and to use the supine position only (p<0.001) were achieved post test. Significant positive changes in nurses’ knowledge were achieved post-test relating to the appropriate age for wrapping infants; 0-6 months (p<0.0001).

b) attitudes towards wrapping and/or swaddling practices?
Positive changes in nursing attitudes were achieved post-test with responses significantly more consistent with the evidence for the promotion of the supine position (p<0.0001); infants who frequently wake (p<0.001) or startle (p=0.0003); painful procedure management (p<0.001); infant drug withdrawal (p<0.0001) and babies with colic (p<0.001).

c) practices relating to wrapping and/or swaddling strategies?
The educational intervention achieved significant positive changes post test relating to parental advice to use wrapping in the supine position as an alternative settling/sleep strategy to the prone position for both 2 month (p<0.001) and 4 month old (p<0.001) infants. Following the intervention half the respondents (63, 50%) still would not have recommended this strategy with a further 11 (9%) of nurses unsure of advice for 4 month old infants, highlighting the need for further improvement in knowledge and practices relating to infant wrapping for all infants aged 0-6 months.

d) consistency in approach to wrapping and/or swaddling strategies?
Prior to the intervention 113 participants (74%) said they were aware of safe and unsafe practices, and post intervention this increased to 93%, achieving a significant positive change in nursing knowledge (pre post change, p=0.02). Understanding of the SIDS and Kids recommendation relating to advice to wrap an infant in the supine position was significantly improved post test (47% vs 81%, p<0.0001). Post intervention, more nurses indicated that they would discuss safe wrapping strategies (82% vs 90%) and significantly more stated they would support the parent’s decision to use the strategy of wrapping (30% Vs 48%, p=0.001). Significantly fewer respondents indicated that they would suggest alternative settling strategies (including prone positioning) to parents who chose to wrap their infant (40% vs 19%, p=0.001).
7.1 STRENGTHS AND LIMITATIONS

The pilot study for this investigation achieved its objectives to test the survey for ease of administration and clarity of items. Minor formatting changes were made as a result of the pilot and review by the expert panel that were utilised in the main study. The final tool that was developed has been demonstrated to be a reliable and valid tool in investigating nursing knowledge, attitudes and self-reported practices and parent advice relating to the infant care practice of wrapping and/or swaddling infants.

The study was successful in achieving excellent response rates for the pre test (86%), the intervention (64%), and the post test (74%) phases providing a representative group of child health nurses who worked in nine health service districts within the state of Queensland. The similar response rates across the three phases may be indicative of the consistent methods used in recruitment; explanation of the study; and follow-up in each of the areas. Child health nurses caring for infants in community settings are likely to find parent education and advice relating to infant care practices, particularly for unsettled infants to be a more relevant part of their practice, compared to acute and perinatal areas.

The timeliness of this cross-sectional survey conducted in south east Queensland prior to the launch of the state-wide policy document and minimum practice standards ‘Safe infant care to reduce the risk of Sudden Infant Death Syndrome’ (Queensland Health, November 2005) resulted in the ideal opportunity for the results of this study and the literature review to inform the state public health campaign of the identified knowledge and practice deficits of health professionals relating to the Safe Sleeping messages in Queensland, and at a national level through SIDS and Kids. The research team members collaborated with staff from the Child and Youth Health Unit in the development of the policy document, accompanying information circular and the parent information sheet and with SIDS and Kids in the development of a SIDS and Kids endorsed Information Statement on Wrapping Infants (Please see Section 10.0 Study Outcomes for reference details). More recently, in 2006, the principles of safe wrapping have been included in the Safe Sleeping Education program for health professionals currently being piloted by Young and colleagues (2006) in the Royal Children’s Hospital and Royal Women’s and Brisbane Health Service Districts; the revision of the Queensland Health Child and Youth Health manual and in the program Certificate IV in Aboriginal & Torres Strait Islander Child and Youth Health currently being developed. Queensland Health is currently revising several state-wide maternity clinical pathways (neonatal, vaginal birth and caesarean birth); Safe Sleeping recommendations included advice relating to infant wrapping is now included in these clinical pathways to be released by the end of 2006.

This study acknowledges several limitations relating to the survey method used. Surveys have been demonstrated to be a valid and reliable method of obtaining information about knowledge and attitudes of respondents relating to a particular practice issue (Edwards et al., 2001;
Manworren, 2000). Many survey studies have also included an evaluation of practices (Jacob and Puntillo, 1999), as in this study, however it is recognised that practice data obtained is limited by the self reporting nature of the survey tool (Edwards et al., 2001), and therefore may not be a completely accurate assessment of actual practices that respondents utilise in daily practice. For example when asked what advice they provide to parents, however, it may be possible that child health nurses may indicate that they give the recommended advice, rather than what they believe, when in actual fact they could give parents the recommended advice but also what they believe. For example, Roberts and Upton (2000) cite instances of inappropriate professional practice that may have perpetuated incorrect infant sleeping positions utilised by parents at home. Inconsistency between public health recommendations and health professional advice would serve to perpetuate the continued use of prone sleeping by parents, which is currently documented to be higher in Queensland than compared to the rest of Australia (Schluter and Young 2002; Queensland Health, 2005; Young et al 2006a).

A subsequent practice audit was completed by the novice researchers at Riverton Early Parenting Centre to capture advice provided to parents about infant settling techniques prior to admission, on discharge and at 4 weeks post discharge from Riverton which will provide information of the effectiveness and utilisation of wrapping advice provided by nurses to parents of unsettled infants. A concurrent audit of practices and parental advice provided by nurses and midwives is currently being carried out through another related project by Young and colleagues (2006b) that is addressing safe infant sleeping practices. Actual practice data related to infant wrapping will be captured in the study’s audit component. In addition, inclusion of infant wrapping on the state-wide maternity clinical pathways will provide an excellent source of data relating to provision of infant wrapping advice and identify inconsistencies between policy and practice in the future.
8.0 SUMMARY

The current SIDS and Kids Safe Sleeping recommendations (SIDS and Kids 2002), consistent with Queensland Health policy (Queensland Health 2005) and the Public Health Association of Australia (PHAA 2005) and based on the scientific evidence, are:

1. Put baby on the back to sleep, from birth
2. Sleep baby with face uncovered
3. Cigarette smoke is bad for babies

The incidence of prone sleeping in Queensland at 12% is the highest recorded in any state of Australia (Queensland Health 2005; Young et al 2006b). Indigenous infants were also significantly less likely to be placed in the recommended supine position than non-Indigenous infants. Differences between actual infant care practices and recommendations for safe infant sleep demonstrate that current advice is either not received or not implemented by a proportion of the population at risk (Young et al 2006b).

Motivating factors for parents who choose to settle their infant prone is that the infant appears to be more comfortable and to sleep better (Willinger et al 2000). However wrapping an infant in the supine position has been shown to calm infants and to improve settling to sleep (Gerard et al 2002a), as well as reduce the risk of SIDS by maintaining the infant in the supine position (Wilson et al 1994, Ponsonby et al, 1993, Gerard et al 2002a, 2002b). Wrapping and/or swaddling infants in the prone position, however, is associated with an increased risk of SIDS (Ponsonby et al 1993). We therefore have evidence that wrapping can be offered to parents as an effective alternative settling and sleep strategy for young infants to discourage parents from settling in the prone position.

In summary, this study has identified knowledge and attitudinal deficits related to wrapping and to Safe Sleeping messages in child health nurses caring for infants and their families in south east Queensland. These deficits have been demonstrated to impact upon the quality of advice provided to parents. This educational intervention was extremely effective in positively impacting knowledge, attitudes and practices of child health nurses regarding safe wrapping practices for infants. Project findings highlighted the need for a more consistent and evidence-based approach to the practice of wrapping infants.
9.0 RECOMMENDATIONS

Principles of safe and effective infant wrapping, have been developed by the SIDS and Kids Safe Sleeping Sub-Committee (Dr Young is a member) and endorsed by SIDS and Kids. These principles of wrapping include (See Appendix A.4, SIDS and Kids 2005):

- Ensure that baby is positioned on the back with the feet at the bottom of the cot.
- Ensure that baby is wrapped from below the neck to avoid covering the face.
- Sleep baby with face uncovered (no doonas, pillows, cot bumpers, lambs wool or soft toys in the sleeping environment).
- Use only lightweight wraps such as cotton or muslin (bunny rugs and blankets are not safe alternatives as they may cause overheating).
- The wrap should not be too tight and must allow for hip and chest wall movement.
- Make sure that baby is not over dressed under the wrap. Use only nappy and singlet in warmer weather and add a lightweight grow suit in cooler weather.
- Provide a safe sleeping environment (Safe cot, safe mattress, safe bedding).
- Babies must not be wrapped if bed sharing with an adult. Bed sharing can be hazardous in certain circumstances. See SIDS and Kids information statement for bed sharing advice.

Most babies eventually resist being wrapped. An alternative to wrapping is to use a safe infant sleeping bag; one with a fitted neck and is the right size for the babies weight. Clothing can be layered underneath the sleeping bag according to climate conditions. There is some evidence that sleeping bags may assist in reducing the incidence of SIDS, possibly because they delay the infant rolling in to the tummy position and eliminate the need for bedding. It is important to encourage tummy time to play when the infant is awake and supervised by an adult, but infants must not be allowed to sleep in the tummy position."


These safe infant wrapping principles to support the public health recommendation of supine sleep for infants (PHAA, 2005) should be integrated into all related policy initiatives at local, state and national level and incorporated into undergraduate maternity and paediatric modules, Transition to Paediatrics and Child Health modules and General Practitioner education.
10.0 STUDY OUTCOMES

1) This study identified the educational needs of child health nurses relating to safe infant wrapping and the Safe Sleeping recommendations to reduce the risk of SIDS, sudden unexpected death in infancy and sleeping accidents and highlighted some of the reasons behind noncompliance with current recommendations.

2) This study's educational intervention delivered by two experienced child health nurse clinicians effectively and positively impacted on child health nurses' knowledge, attitudes and practice relating to wrapping as an effective, safe infant sleep and settling strategy in nine health service districts in south east Queensland.

3) The timeliness of this study allowed the research team to highlight the need for evidence based strategies to support the use of the supine position by health professionals with the national SIDS and Kids organisation and to contribute to the development of these evidence based principles of safe infant wrapping. These study aims were therefore consistent with recommendations for future research priorities proposed by SIDS and Kids; the Global Strategy Task Force for SIDS; the Queensland Paediatric Quality Council, the Public Health Association of Australia and the National Institute of Clinical Studies.

4) The timeliness of the study and the research team collaborations with policy makers directly contributed to the inclusion of safe infant wrapping as a strategy to support the use of the supine position in the following recent policy initiatives by SIDS and Kids and Queensland Health during 2005 and 2006:


5) The Safe Sleeping Education Program for Health Professionals (Young et al 2006b) has included the principles of safe infant wrapping in Session 2 of the 4-module program that was developed to address identified deficits in knowledge, attitudes and practices related to Safe Sleeping recommendations. This program is being piloted during 2006-2007 in the Royal Children’s Hospital and Royal Brisbane & Women’s Hospital Health Service Districts. This pilot by Young et al (2006b) includes questions related to wrapping which will provide data to compare to these study results in this report by Gore et al (2006) in the future. If rolled out state-wide, this program will provide a sustainable educational resource for health professionals relating to Safe Infant Sleep to support the Queensland Health policy document.

6) A more consistent approach and increased use of wrapping as an effective, safe infant sleep and settling strategy has been observed at the Riverton Early Parenting Centre; supported by a practice audit during 2006.

7) SIDS and Kids Safe Sleeping Subcommittee will provide recommendations for the revision of the pamphlet:

‘Wrapping Infants: Guidelines for safe wrapping of infants in the first 12 months’. (Health Information pamphlet). Adelaide: Collaborative publication of Women’s and Children’s Hospital, South Australia and SIDS and Kids South Australia.

8) Dissemination of study results through publication and conference presentation will contribute to scientific literature relating to the effectiveness of public health campaigns and the educational needs of health care professionals relating to SIDS, known risk factors and strategies to support the public health recommendations.
11.0 CONCLUSION

Future public health campaign messages can be targeted to ensure that these need areas, specifically the provision of evidence based information related to wrapping infants as a strategy to support the use of the supine position consistent with the Safe Sleeping recommendations, are specifically addressed by the media campaign. In addition, a follow-up study to evaluate the effectiveness of this campaign in raising awareness about SIDS and the Safe Sleeping messages is being conducted during 2006-7 (Young et al 2006b), and includes questions related to infant wrapping practices by nurses and midwives to compare against this baseline of nursing and midwifery knowledge, attitudes and practices relating to infant wrapping that has been established by this study.

Child health nurses have a key role in reinforcing safe sleeping recommendations and offering parents safe, effective settling/sleep strategies (Young and Schluter 2002; Jeffery 2004). Promotion of wrapping as an alternative settling strategy will reduce the current high incidence of prone sleeping in Queensland infants. Raised awareness of the Safe Sleeping recommendations by all members of the public, including health professionals, together with parental implementation of these infant care practices will ultimately reduce the number of infant deaths in Queensland that are attributed to SIDS, Sudden unexpected deaths in infancy and sleeping accidents.

www.luvatbaby.com/swaddling/swaddling.htm
12.0 DISSEMINATION OF RESULTS

12.1 CONFERENCE PRESENTATIONS


- GORE R, GORMAN B, YOUNG J, RAMSBOTHAM J. (2006) Wrapping infants as an alternative strategy to prone positioning for unsettled infants. 9\textsuperscript{th} Biennial International Paediatric and Child Health Nurses Conference: ‘Caring through Diversity’. Sofitel Hotel, Melbourne. 17\textsuperscript{th}-19\textsuperscript{th} May, 2006. Poster presentation.

- YOUNG J. (2006) Safe Sleeping to reduce the risk of SIDS, SUDI and fatal sleeping accidents: what every nurse caring for families with infants and young children should know. Royal College of Nursing Conference: ‘Making Children and Young People Matter’, Thistle Hotel, Bristol, United Kingdom, 14-16\textsuperscript{th} September, 2006. Workshop Presentation.


12.2 LOCAL CLINICAL AND RESEARCH FORUMS

- GORE R, GORMAN B (2005) May – August 2005: Educational intervention delivered in the nine participating health service districts with 65% attendance by staff members in those areas. Lecture notes available to all staff.


12.3 INVITED SPEAKER PRESENTATIONS (where wrapping project was discussed)


- ‘Nursing research making an impact in the public health arena: Reducing the risk of Sudden Infant Death Syndrome’. Innovations in Paediatric, Child, Youth and Mental Health Practice: Nursing Outreach, International Nurses Day. 12th May, 2005. Education Centre, Royal Children’s Hospital, Herston. Wrapping study used an example of evidence-policy-practice change in this RCH forum.


12.4 PAPERS FOR PUBLICATION


Two papers are in draft and will be submitted for publication by March 2007:

- Promotion of Safe Sleeping initiatives: results of a study evaluating a targeted intervention to promote the use of the supine sleep position (proposed journal: Journal of Advanced Nursing).

- Nurse researchers impacting policy and practice: case study of how a nursing research mentorship model has contributed to and influenced policy initiatives at a local, state and national level. (proposed journal: Collegian).
13.0 ETHICAL CONSIDERATIONS

Ethics approval to conduct this study was initially obtained from the Queensland Health Central Office Human Research Ethics Committee and registered on the Queensland Health Promart Research Registry (No 515). Ethics approval was obtained from the following ethics committees:

- Royal Children’s Hospital & District Health Service Ethics Committee
- Royal Women’s Hospital Human Research Ethics Committee
- Redcliffe – Caboolture Health Service District Ethics Committee
- Bayside Health Service District Human Research Ethics Committee
- Gold Coast Health Service District Human Research Ethics Committee
- West Moreton Health Service District Human Research Ethics Committee
- Princess Alexandra Hospital Human Research Ethics Committee
- Toowoomba Health Service District Human Research Ethics Committee
- QEII Hospital Health Service District Human Research Ethics Committee

Security: All information has been kept in the strictest confidence, in a locked filing cabinet accessible only to the researchers.

Anonymity: Information has not, and will not be published that will allow for any individual or group to be recognised. Staff surveys were returned to a sealed box or mailed directly to the researchers. Surveys did not contain personal information that could link the survey to a particular individual. Surveys were numerically coded to allow reminder notices for failure to return the survey. After one reminder, the numerical list linking returned surveys to subjects was destroyed.

Voluntary participation: All staff that entered this project did voluntarily and were free to withdraw from the project at any time without comment or penalty.

Consent: A Plain Language Statement of information about the study accompanied the survey tool given to potential participants in phases one and three. Participants were asked to read the information sheet and informed that the return of the survey would be an indication of their consent to participate in the study. Phone numbers of both the researchers and the appropriate Ethics committee (relating to the area of practice) were available to the participants at all phases of the study should they require further information about the project or were concerned with the ethical conduct of this study.

Potential risks: Participation in this project was unlikely to involve risks to the participants. In order to minimise risk of harm to participants, the following steps were taken: 1) The participant was aware that they may discontinue the survey or their participation in the study at any time; 2) contact numbers of the researchers was provided; 3) participants were reassured that information provided by them would be coded to ensure they could not be identified. No participants contacted the investigators regarding ethical concerns relating to the study.
14.0 REFERENCES


REFERENCES continued..


14.0 REFERENCES continued...


REFERENCES continued...


Young J, New K, Colditz P, Williams A (2006b) Safe Sleeping Education Program for Health Professionals, research project supported by Golden Casket Rainbow Kids and Queensland Health.


15.0 BIBLIOGRAPHY


16.0 APPENDIX A

APPENDIX A.1

PARTICIPATION INFORMATION SHEET PHASE 1 (PRETEST)

APPENDIX A.2

PARTICIPATION INFORMATION SHEET PHASE 3 (POST TEST)

APPENDIX A.3

INFANT WRAPPING SURVEY TOOL

APPENDIX A.4