

SIDS, Sleep, and Suffocation: The Facts

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How to Take This Course

Please take a look at the steps below; these will help you to progress through the course material, complete the course examination and receive your certificate of completion.

1. REVIEW THE OBJECTIVES

The objectives provide an overview of the entire course and identify what information will be focused on. Objectives are stated in terms of what you, the learner, will know or be able to do upon successful completion of the course. They let you know what you should expect to learn by taking a particular course and can help focus your study.

2. STUDY EACH SECTION IN ORDER

Keep your learning "programmed" by reviewing the materials in order. This will help you understand the sections that follow.

3. COMPLETE THE COURSE EXAM

After studying the course, click on the "Course Exam" option located on the course navigation toolbar. Answer each question by clicking on the button corresponding to the correct answer. All questions must be answered before the test can be graded; there is only one correct answer per question. You may refer back to the course material by minimizing the course exam window.

4. GRADE THE TEST

Next, click on "Submit Test." You will know immediately whether you passed or failed. If you do not successfully complete the exam on the first attempt, you may take the exam again. If you do not pass the exam on your second attempt, you will need to purchase the course again.

5. FILL OUT THE EVALUATION FORM

Upon passing the course exam you will be prompted to complete a course evaluation. You will have access to the certificate of completion **after you complete the evaluation**. At this point, you should print the certificate and keep it for your records.

About the Author

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Objectives:

At the completion of this learning activity the learner will be able to:

- Define currently utilized terms that apply to sleep situations involving infants.
- Discuss risk factors for Sudden Infant Death Syndrome (SIDS).
- Describe current recommendations for sleep practices involving infants.
- Discuss risk factors for infant suffocation.
- Describe the role of the healthcare provider in the prevention of adverse infant sleep outcomes.

Introduction

Are you aware of the correct way to position an infant for sleep? Recommendations have changed considerably in the past decade. The infant sleep environment can be hazardous and can contribute to SIDS or suffocation.

Sudden Infant Death Syndrome (SIDS) is the third leading cause of death in infants aged one month to one year in the United States (Mathews & MacDorman, 2007). To combat this tragic loss, in 1994 the US Public Health Service, The American Academy of Pediatrics (AAP), and the SIDS Alliance joined together to promote the ***Back to Sleep*** campaign. This campaign sought to educate the public about the dangers of certain sleep practices related to infants. Since the *Back to Sleep* program began in 1992, the rate of SIDS has declined approximately 50%. Unfortunately, certain ethnic groups still experience double the national SIDS rate. While the current rate of SIDS has reached a plateau, the rate of infant suffocation in the United States is dramatically increasing.

The purpose of this course is to explore the facts regarding SIDS and infant suffocation, and the responsibilities of healthcare providers.

Suitable for:

- Novice neonatal nurses
- All nurses interested in learning about newborn health and the latest SIDS information.

Definitions

There are multiple terms that are used when discussing infant sleep practices and problems; these terms can be quite confusing. Bedsharing, co-bedding, and co-sleeping are terms that are often used interchangeably.

Bedsharing: Parent and infant share the same bed, chair, or sofa; sharing a bed with anyone (adult or child).

Co-bedding: Close together in the same bed space.

Co-sleeping: A broad term; may signify the parent and child sharing the same bed. The term may imply parent(s) and child sleeping in close proximity without bodily contact. It can also imply the infant sleeping in the arms or sling of a parent.

Entrainment: The sleep, respiratory, and cardiac rhythm of one partner affecting the other while co-sleeping.

Overlying death: The infant is pinned beneath the body of another person resulting in suffocation.

Sudden Infant Death Syndrome (SIDS): The sudden and unexplained death of an infant (less than one year of age) during sleep, despite a thorough case investigation, autopsy, and review of clinical history.

Sudden and Unexpected Death of an Infant (SUDI): The sudden and unexpected death of an infant due to natural or unnatural causes.

Suffocation: Death caused by obstruction of the breathing passages.

Sudden Infant Death Syndrome

Sudden Infant Death Syndrome (SIDS) is one of the five leading causes of death in infants from birth to one year of age in the United States. In 2004, the five leading causes of death in infants accounted for 55% of all infant deaths in the U.S. (see Table 1). SIDS is the third leading cause of death in infants (8% of deaths in infancy), following congenital anomalies and short gestation (Mathews et al., 2007). It is the leading cause of death among infants from 28 to 364 days (Centers for Disease Control and Prevention [CDC], 2008a).

Cause of Death	Rank	Percent
Congenital malformations, deformations, and chromosomal abnormalities	1	20%
Disorders related to short gestation and low birth weight	2	17%
SIDS	3	8%
Newborn affected by maternal complications of pregnancy	4	6%
Accidents	5	4%

Source: Mathews et al., 2007

SIDS is the sudden and unexplained death of an infant less than one year of age despite a thorough case investigation, autopsy, and review of clinical history. SIDS is most common in the winter months. Fifty to eighty percent of deaths occur between the hours of midnight and 6 a.m. Males are affected more than females, with a ratio of 3:2. The peak incidence occurs between the ages of two and four months. The majority (90%) of SIDS deaths occur within the first six months of life. Seventy percent of deaths have occurred following a mild upper respiratory (URI) or gastrointestinal (GI) illness.

Although the incidence of SIDS in the United States has decreased over the last two decades (10% lower in 2005 than in 1995) for infants less than one year in age (Mathews et al., 2007), certain ethnic groups continue to maintain a higher incidence of this syndrome. The highest rates for SIDS are found in the African American and American Indian populations. These rates are twice that of Caucasian Americans. When compared to Caucasian Americans, the SIDS rate is 49% lower for Asian or Pacific Islander infants, 51% lower for Mexican infants, and 70% lower for infants born in Central and South America (Mathews et al., 2007).

Risk Factors for SIDS

The risk factors for SIDS include maternal, infant, and environmental factors.

Maternal	Infant	Environmental
Age < 20 years	Premature or low-birth weight	Prone (stomach) sleeping
Late or no prenatal care	Multiple gestation	Overheating
Perinatal smoking	Male gender	Second hand smoke exposure
Drug/alcohol abuse	Recent URI/GI illness	Low socioeconomic status
Pregnancy interval < 1 year	African American or American Indian	Bedsharing
		Cluttered sleeping area/soft sleep surface and loose bedding

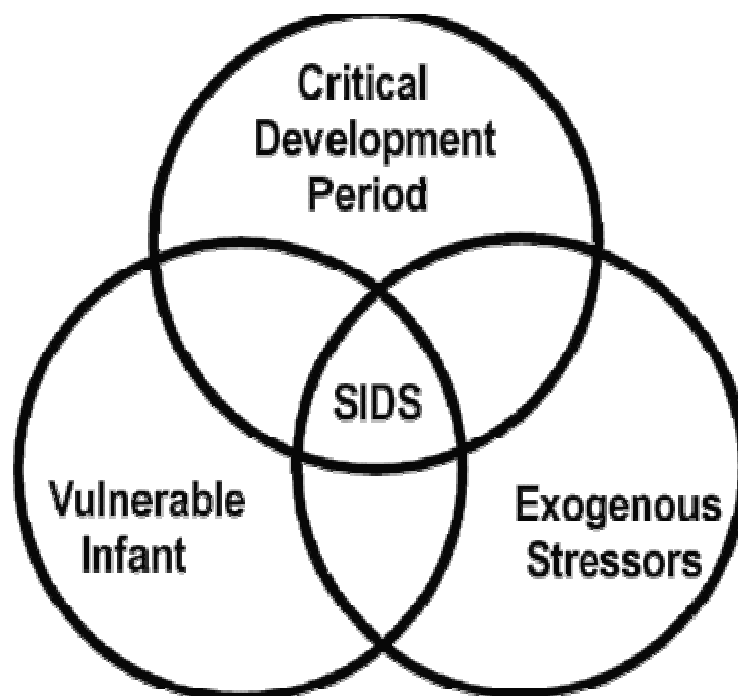
Sources: Iyasu et al., 2002; Mathews et al., 2007

As previously mentioned, some ethnic groups have a higher incidence of SIDS. This higher incidence has been associated with factors that increase the risk for SIDS. These include low birth weight, nicotine use, bedsharing and utilizing a prone position for infant sleep.

Several factors are cited for this increased risk of SIDS, such as poverty and limited access to health care. African Americans are twice as likely to be born low birth weight (lbw) (<2500 grams), and three times more likely to be born very low birth weight (vlbw) (<1500 grams). Parents often report low educational levels. Nicotine is metabolized slower in African Americans, and is thought to result in increased accumulation in the fetus. African Americans are twice as likely to place infants in a prone sleeping position (Safe Sleep Campaign, 2000). Thirty-one percent of African Americans placed their babies on their backs to sleep compared to 47% of Caucasians. Thirty-nine percent of the surveyed African Americans learned about infant sleep positioning from their grandparents in contrast with 12% Caucasian respondents. Forty-five percent of Caucasians reported learning about infant sleep positioning from a pediatrician or nurse practitioner. Minorities are more likely to add toys, blankets, and comforters to cribs (Safe Sleep Campaign, 2000).

A study of northern Plains Indians showed a relationship between binge drinking and an increased incidence of SIDS (National Institute of Child Health and Human Development [NICHD], 2001). Many North American Indian reservations are in remote locations with limited access to healthcare.

Causes: Theory and Research



*Figure 1. Triple Risk Model of SIDS
(Filiano & Kinney, 1994)*

The Triple Risk Model proposed by Filiano and Kinney (1994) is still the current theoretical model for SIDS. This hypothesis proposes a multi-factorial source for this syndrome. Three elements must interact for SIDS to occur: a vulnerable infant, a critical period of development, and exogenous stressors.

The critical period is typically the first six months of life. During this period rapid changes are occurring in the homeostatic mechanisms of the brain and heart, possibly affecting respiration, sleep, heart rate, blood pressure, and thermoregulation. Exogenous stressors refer to environmental challenges such as prone positioning, tobacco smoke, or overheating.

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Vulnerable Infant/Underlying Defect

A vulnerable infant, according to this model, has an underlying pathophysiological defect. Some of the physiological problems can include brain abnormalities, metabolic disorders and cardiac problems.

Brainstem analysis of SIDS victims has demonstrated hypoplasia or decreased neurotransmitter binding in the arcuate nucleus. The arcuate nucleus is found in the medulla, and is involved in cardiorespiratory and arousal response (Filiano et al., 1994). Structural or biochemical abnormalities in the brainstem may affect vital signs, arousal, and respiratory drive.

Medium Chain Acyl-CoA Dehydrogenase Deficiency (MCAD) is an inherited metabolic disorder of beta-oxidation of fatty acids. This inability to convert fats to glucose can result in severe hypoglycemia and hypoketonuria. It is estimated that 1/100 SIDS cases is undiagnosed MCAD. Signs typically appear during the second month of life following periods of stress or fasting. Vomiting, lethargy, and seizures can result in cardiac instability and death. Autopsies of babies with MCAD typically show cerebral edema, severe fatty livers, heart, and kidneys. Several states include MCAD testing as part of newborn screening. New York State has added screening for MCAD to the newborn screening process.

Prolonged QT Syndrome has also been implicated in SIDS. The QT interval represents the time for electrical activation/inactivation of the cardiac ventricles. A prolonged QT interval is > 440 milliseconds, and can result in fatal arrhythmias. This marker of cardiac instability is strongly associated with SIDS. An Italian study (Schwartz, Stramba-Badiale, & Segantini, 1998) demonstrated that 30-35% of the reviewed SIDS cases had prolonged QT interval in the first week of life. The study concluded that prolonged QT interval in the first week of life increased the risk of SIDS 41.3%. Other research implicates a defective gene in approximately 10% of SIDS victims associated with lethal cardiac arrhythmias (ScienceDaily, 2007).

Critical Period

Human infants are born neurologically immature. They possess limited physical and developmental capabilities to respond to events. The autonomic nervous system is unstable during the first few months of life, undergoing changes that may affect sleep, the cardiac system, respiratory system, and arousal response. Brain growth triples in the first year of life. In addition, the neonate has weakness of neck muscles, a large head mass (8-10% of total body weight), and is an obligate nose breather. Additionally, prenatally acquired maternal antibodies wane at two to four months of age.

Newborns spend 50% of sleep in the REM (rapid eye movement) stage, compared with 25% of sleep for adults. Neonates enter REM sleep first, until around three months of age. After three months of age, non-REM sleep occurs first. Premature infants can spend up to 80% of sleep in the REM stage. Large amounts of REM sleep are necessary for growth and development in the neonate. During REM, poor head, neck, and muscle tone is evident. Nerve impulses that pass through the spinal cord are blocked. Heart rate, blood pressure, respiratory rate, temperature regulation and blood flow to the brain all show irregularities during REM sleep. All of these factors contribute to a "critical period" for the infant.

Exogenous Stressors

Prone Sleep Position. Babies sleep differently when prone. They sleep longer, spend more time in non-REM sleep, and have fewer and shorter arousals. Late 1980s researchers noted an increase in the incidence of SIDS when infants were placed in the prone sleep position. Between 10% and 60% of SIDS victims are found with their face, head, or entire body covered with some form of bedding such as a pillow, blankets or comforter.

Twenty-five to 50% are found prone in the bedding (NICHD, 2001). Prone positioning and over-bundling can cause overheating and asphyxia. Pockets of exhaled carbon dioxide (CO₂) can accumulate in the bedding. Rebreathing of CO₂ can cause low oxygen levels, which may impair the arousal response. In

1992, the American Academy of Pediatrics (AAP) recommended that infants be placed on their backs or sides to sleep to decrease the incidence of SIDS. In 1994, the U.S. Public Health Service, the AAP, and the SIDS Alliance joined to promote the *Back to Sleep* campaign. Recommendations from this program are included later in the course.

In 1995, the supine position was the only recommended position for safe sleep (AAP, 2005). American Indians and African Americans are the current focus of national campaigns. These groups still have double the national SIDS rate, and are twice as likely to place their infants in the prone sleep position.

Since the inception of the *Back to Sleep* program, the rate of SIDS has declined by approximately 43% (Carolan, 2007). The rate of supine sleeping increased from 17% to 51% from 1994 to 1998 and has leveled since 1998 (Aris et al., 2006). Unfortunately, it is estimated that 20% of caregivers still revert infants from the supine to prone sleep position at one to three months of age. Twenty percent of SIDS cases are estimated to occur in childcare settings. Grandparents and caregivers may be unaware of the *Back to Sleep* recommendations. Prior to 1992, they were advised to place their infants prone when sleeping to avoid aspiration.

The NICHD supported a study conducted by Kaiser Permanente in Northern and Southern California that assessed the risk factors for infants placed in unaccustomed sleeping positions. As reported in the *American Journal of Epidemiology*, infants who normally sleep on their backs and are placed on their stomachs or sides are at a greater risk for SIDS than infants who are already at risk because they always sleep on their stomachs or sides. The study suggested this occurrence is linked, in part, to the instability of side sleeping positions; the infant may fall over onto its stomach.

Because of the higher risk for SIDS among African Americans in 2003 NICHD began a collaborative effort with the National Coalition of 100 Black Women, Inc., the Women in the NAACP, and Alpha Kappa Alpha Sorority, Inc. to educate African American women how to conduct SIDS outreach programs in their local communities across the country (NICHD, 2004). Education is the key to reducing the incidents of SIDS and infant suffocation.

Soft Bedding Surface. Research has shown that placing a baby to sleep on soft mattresses, sofas, sofa cushions, waterbeds, sheepskins, or other soft surfaces greatly increases the risk of SIDS (CDC, 2008b; NICHD, 2003).

The Chicago Infant Mortality Study (Hauck et al., 2003) studied all infants from the ages of birth to one year who had died of SIDS in Chicago, Illinois, between November 1993 and April 1996. There were 260 SIDS deaths during that time.

The researchers noted that sleeping on the stomach and sleeping on soft bedding — both known to increase the risk of SIDS independently — posed a much greater risk for SIDS when occurring together than might be expected. This analysis confirms several international studies reporting that SIDS risk was lower among infants put to bed with a pacifier and reinforced earlier findings that sleeping on a sofa also increases infants' risk of SIDS.

Soft bedding appeared to pose five times the risk of SIDS as firm bedding; sleeping on the stomach increased the risk of SIDS 2.4 times. Yet infants who slept stomach down on soft bedding had 21 times the risk of SIDS as infants who slept on the back on firm bedding (Hauck et al., 2003).

Of the SIDS cases in the Chicago Infant Mortality Study, 15 were found to have slept on a sofa the last time they were placed to sleep. The researchers do not know why sleeping on a sofa would increase the risk of SIDS more than would sleeping on a bed, yet warn that the practice appears to be highly dangerous. Other studies have found that wedging between a parent or with pillows on a sofa were contributors to accidental asphyxiation (Byard, Beal, Blackbourne, Nadeau, & Krous, 2001).

Co-sleeping. Bedsharing with other children, including brothers and sisters, is unsafe for infants. It increases the risk for SIDS as well as for suffocation. There have been reports of infants being suffocated from overlying by an adult, brother, sister, or other family member who was sharing a bed with an infant (NICHD, 2003).

According to the results of the Chicago Infant Mortality Study (Hauck et al., 2003), infants who died of SIDS were 5.4 times more likely to have shared a bed with other children than were the control infants. Sleeping with the mother alone or mother and father was associated with an increased risk of SIDS, but this finding was not statistically significant. The study concluded that the risk was primarily associated with bedsharing when the infant was sleeping with people other than the parents. The researchers also reported that sleeping with the mother alone did not reduce an infant's risk of SIDS, as some researchers have concluded on the basis of earlier studies.

Infection. The peak incidence of SIDS corresponds with a critical period in the development of the immune system. Maternal antibodies decline between 2 to 4 months of age. SIDS is more prevalent during the winter months, a period of increased viral activity. *Escherichia coli* (*E. coli*), *Staphylococcus aureus*, *Clostridium difficile* (*C. difficile*), influenza, cytomegalovirus (CMV), and respiratory syncytial virus (RSV) are among the organisms cultured from victims. Most victims had a mild upper respiratory illness or gastrointestinal illness preceding death.

An Australian study by Dr. Paul Goldwater found curli, a by-product of *E. coli*, in the blood of all tested SIDS babies, but none in the comparison group. Small hemorrhages in the heart and lungs, heavy wet lungs, and unclotted blood in SIDS victims are signs consistent with a toxin (Goldwater, 2003).

Vaccination. With SIDS being the leading cause of death among infants and the increased requirements for vaccinations, it is no wonder people are concerned about a correlation between the two. Since 1994, the National SIDS Resource Center has maintained that SIDS is not caused by the diphtheria, pertussis, tetanus (DPT) vaccines, or other immunizations.

In October 2002 the Institute of Medicine formed the Immunization Safety Review Committee (ISR) to research and address issues related to vaccinations, illnesses, and death. The ISR reviewed epidemiologic evidence, case studies, clinical evidence, and to hear presentations of key papers and information from unpublished research regarding a possible correlation between vaccinations and SIDS. After examining the materials the committee rejected the notion that there is a causal relationship between certain vaccines and SIDS (Stratton, Almario, Wizemann, & McCormick, 2003). The committee did, however, recommend to federal vaccine research policymakers, state and local vaccine program implementers, healthcare professionals, the public, and the media that surveillance, research, policy, and communication regarding this concern be maintained (Stratton et al., 2003).

Breastfeeding. No study to date has proven that breastfeeding can decrease the incidence of SIDS. The AAP states there is not enough evidence to recommend breastfeeding as a method of reducing the risk of SIDS (AAP, 2005). Research has demonstrated that breastfed infants are more easily aroused compared to formula fed infants.

Studies have demonstrated that breastfeeding can decrease the severity and incidence of infant illnesses such as meningitis, otitis media, upper respiratory infections, and gastroenteritis. At 60 days post-partum there is a sharp decline in leukocytes found in breast milk (Lawrence & Lawrence, 1999). This is the period for peak incidence of SIDS. Infants who die of SIDS are less likely to have been breastfed according to some studies. Bottle fed infants are not at an increased risk.

Pacifiers. Current research has demonstrated a decreased incidence of SIDS among infants less than one year of age who sleep with pacifiers (Fleming, 1999; Hauck, Omojokun, & Siadaty, 2005). Theory suggests that pacifiers may act as an oral airway and aid in clearance of mucous along with a role in cardiac autonomic system balance. It has also been proposed that infants who sleep with pacifiers are more easily aroused. Pacifier use is associated with a shortened duration of breastfeeding, increased risk of otitis media, along with an increased incidence of thrush.

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Smoking. Most epidemiologic studies have demonstrated that maternal smoking is a major risk factor for SIDS (AAP, 2005). It is also advisable to avoid exposure of the infant to second hand smoke after birth as this can result in other health risks in addition to SIDS.

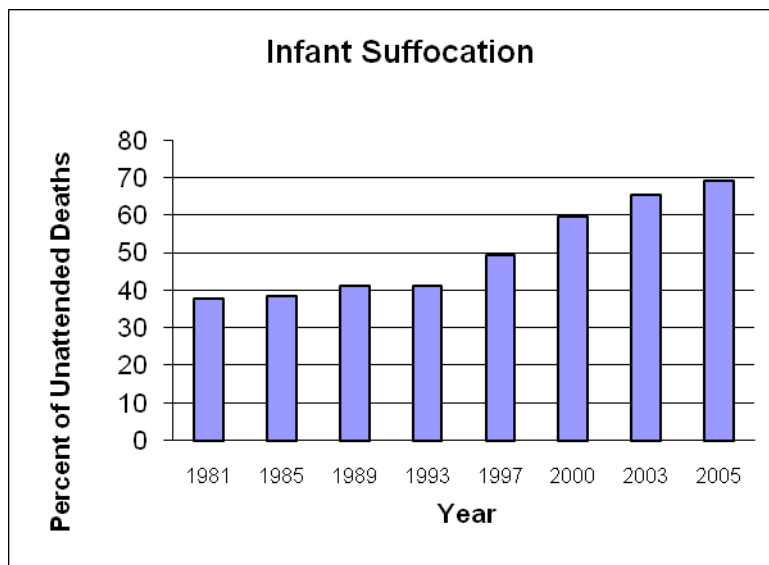
Thermal Stress. Overheating should be avoided and the infant should be dressed lightly and not overbundled. The infant should not feel hot to the touch (AAP, 2005). Room temperature should be kept between 61-68 degrees. The baby should be dressed in a one-piece sleep garment such as a blanket sleeper with the face kept clear of blankets. Multiple layers of clothing and blankets should be avoided. Overheating may lead to a deeper sleep which may be difficult for the infant to wake if any air restrictions occur.

Infant Suffocation

Suffocation is the leading cause of death due to unintentional injury in infants less than one year of age (CDC, 2005). The percentage of unintentional deaths from infant suffocation has increased from 37.8% in 1981 to 69.1% in 2005 (see Table 3). The actual incidence of suffocation may be higher than what is reported.

It is often difficult to distinguish SIDS from suffocation during autopsy. Death certificates may provide only limited information on the cause of death. Parents may be unaware that they may have overlain their infant, or fear to report it. Some coroners or healthcare providers may be reluctant to inform parents that overlay may be the official cause of death. Autopsies for SIDS or SUDI may not be routinely performed or standardized in all parts of the country and world. In May 2002, New York State Governor George Pataki signed a bill (S 4359-A) establishing standard autopsy protocols for every infant who dies from unknown causes, and to support SIDS research.

Table 3. Percentage of Unintentional Deaths from Infant Suffocation 1981-2005 (CDC, 2005)



Drago and Dannenburg (1999) reviewed data from the Consumer Product Safety Commission (CPSC) researching patterns and products associated with infant suffocation. The most frequently occurring patterns of suffocation were wedging, oronasal obstruction, overlying, entrapment with suspension, and hanging. Wedging deaths occurred between a bed and wall, bed and furniture, or between a crib mattress and crib frame. Oronasal obstruction deaths occurred on waterbeds, sofas, bean bag chairs, and pillows. Seventy percent of overlying deaths occurred in infants less than three months of age. Per this study, the estimated rate of overlying infant mortality of 1986-1990 tripled the estimated rate for 1980-1985. The estimated rate of overlying infant mortality for 1991-1995 doubled the rate for 1986-1990. Reasons cited for this increase included increased breastfeeding rates, the promotion of bonding, and increased infant-parent co-sleeping. Hanging deaths occurred when infants became strangled in window blind cords or linens.

Nakamura, Winn, and Danello (1999) studied deaths in children less than two years of age placed to sleep in adult beds. They also reviewed the CPSC data banks and found an average of 64 deaths per year in adult beds. The hazards found included overlying by a parent, sibling or other adult, entrapment, wedging, and suffocation. Seventy-seven percent of the overlying deaths occurred in infants less than three months of age, the highest numbers occurring at one month of age. Parents were often unaware or underestimated the danger of placing their children to sleep in an adult bed.

Co-Sleeping Controversy

Several anthropologists cite that co-sleeping is the norm in non-Western civilization. The incidence of SIDS is lowest in Asian cultures where co-sleeping is common practice. Co-sleeping is thought to have evolved to offset the human infant's immature nervous system. Co-sleeping ensures survival of the species by physiological "entrainment." By definition, entrainment means: "1. to draw along with or after oneself...4. to determine or modify the phase or period of <circadian rhythms *entrained* by a light cycle>" (Merriam Webster Online, 2008). In this case, entrainment refers to the sleep, respiratory, and cardiac rhythm of one partner affecting the other.

Dr. James McKenna, professor of anthropology and director of the Mother and Baby Sleep Lab at the University of Notre Dame, proposed that co-sleeping is favored by natural selection to "confer physiological, social, and psychological survivor benefits" (McKenna & Mosko, 1993). The research concluded that:

- Sleep movements and breathing of one partner (mother) affects the other (infant).
- Infants spend less time in deeper levels of sleep, and more time in REM sleep.
- Infants move more often between sleep levels.
- Infants gain more "practice" at safely navigating through sleep.
- Skin-to-skin contact helps maintain infant body temperature, and stabilizes heart rates.
- Breast feeding is increased, which may offer protective benefits against SIDS.

Additional research by Dr. McKenna demonstrated that roomsharing (a form of co-sleeping) should be recommended. Most infants who die from SIDS in the United States are found sleeping in a separate room (McKenna & McDade, 2005).

Meredith Small, professor of anthropology at Cornell University, reminds us that until the 18th century, bedsharing was the norm in the United States, and private bedrooms did not typically exist (Small, 1998). There is a strong cultural pressure in the U.S. to encourage babies to sleep alone. Co-sleeping is viewed by some as promoting emotional dependence.

The AAP cites that no evidence is available to demonstrate that bedsharing offers protection against SIDS; bedsharing or co-sleeping promotes an increased risk of accidental suffocation (AAP, 2005). The AAP does report that evidence indicates that sharing the same bedroom during infancy is associated with a decrease incidence of SIDS. Other studies have demonstrated that room-sharing may reduce the incidence of SIDS as much as 50% (Carolan, 2007).

The risk factors for infant suffocation while bedsharing include the following:

- Obese parent
- Smoking
- Use of alcohol or drugs
- Fatigue
- Use of waterbed, daybed, sofa, chair
- Sleeping with siblings or adult other than parent
- Loose bedding on sleep surface
- Length of time bedsharing (greater than one hour)

Responsibilities of Healthcare Providers

Infants are helpless and rely on others to meet their needs including safety needs. There are several measures that healthcare providers can follow to help reduce the incidence of SIDS and suffocation. Education is the cornerstone of interventions.

- Identify those at risk for SIDS/suffocation.
- Encourage regular prenatal and well-baby care.
- Encourage breastfeeding.
- Educate families about the risk of smoking.
- Educate families and the community about the *Back to Sleep* campaign. The NICHD and New York State Department of Health have numerous free brochures, posters, and videos to help deliver this important message. Remember to include grandparents and daycare providers!
- Consider writing a news article, or providing a public service announcement!

The *Back to Sleep* recommendations, which should be the focus of teaching families and others who care for infants, should include:

- Healthy infants should be placed on their backs for sleep.
- Firm mattress for crib.
- Blankets and comforters should not be placed under a sleeping infant.
- Pillows and stuffed toys should not be placed in the crib.
- A “smoke-free” zone around baby.
- Regular prenatal care and well-baby care should be obtained.
- If a blanket is used:
 - Place baby with his feet at the foot of the crib “Feet to Foot.”
 - Bring blanket up to chest only.
 - Tuck blanket firmly under crib mattress.

Sleep devices to maintain infant position are not recommended. Many of these devices have not been tested for safety and efficacy. Apnea and bradycardia monitors do not decrease the incidence of SIDS (AAP, 2005).

To reduce the risk of children co-bedding in adult beds, Nakamura et al. (1999) made the following recommendations:

- Children less than two years of age should sleep in cribs that meet federal safety standards.
- Children less than two years of age should not be put to sleep in adult beds.
- Children less than two years of age should not be put to sleep in adult beds with railings that can cause entrapment.
- Parents should be educated on the risk of suffocation when co-sleeping with infants less than five months of age, and the risk of asphyxia due to entrapment.

To avoid the dangers of bedsharing, infants can be placed in CPSC approved cribs. Crib safety specifications include:

- No loose, missing or broken hardware, and slats no more than 2 3/8” apart.
- No corner posts over 1/16” high so clothing won’t catch.
- No cut out designs in head board or footboard so head won’t get trapped.
- A safety certificate seal on new cribs.
- A firm, tight-fitting mattress so infant won’t get trapped between mattress and railings.
- Do not place crib near window blind or curtain cords. This will help prevent strangulation on the loop of the cord.

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- Make sure the space between the mattress and side of the crib is no more than two finger widths.

The Chicago Infant Mortality Study recommendations include (Hauck et al., 2003):

- Physicians and other healthcare providers can strongly influence parents' choice of sleep position for their infant. Parents should be counseled regarding the benefits of placing infants to sleep on their backs, but also about the risk of placing an infant on their stomachs, particularly in combination with soft bedding.
- To reduce the racial disparity in SIDS rates, the authors advised taking families' economic circumstances into consideration. For example, some parents may not be able to afford firmer mattresses or to have enough beds for all their family members. The authors called for research on how best to meet these needs.
- Parents should receive instruction that emphasizes supine sleeping, firm bedding, not using pillows, and not sharing a bed with other children or sleeping with another person on a sofa, while being sensitive to parental concerns and cultural traditions.

It would be beneficial to provide a checklist for safe sleep to families and others. There are numerous free pamphlets and checklists available by mail or online. You can also develop your own "Safe Sleep" checklist or poster.

Conclusion

Although much progress related to SIDS has been made in the last decade, the United States still has a high rate of SIDS compared with other developed nations. There remains a high risk for SIDS among racial minorities in the U.S. Infant suffocation, because it is an accidental event, can be prevented. As healthcare providers, nurses can help reduce the incidence of SIDS and infant suffocation by first increasing our own awareness, knowledge and skill, and then educating parents, caregivers, and the general public.

Resources

The following Web sites provide further information regarding SIDS and infant suffocation:

American Academy of Pediatrics

<http://www.aap.org>

American SIDS Institute

<http://www.sids.org>

Association of SIDS and Infant Mortality Programs (ASIP)

<http://www.asip1.org>

The Canadian Foundation for the Study of Infant Deaths

<http://www.sidscanada.org>

CJ Foundation for SIDS

<http://www.cjsids.com>

National Institute of Child Health and Human Development (NICHD)

Offers a free online course:

Curriculum for Nurses: Continuing Education Program on SIDS Risk Reduction

http://www.nichd.nih.gov/publications/pubs_details.cfm?from=&pubs_id=5685

NICHD Back to Sleep Campaign

<http://www.nichd.nih.gov/sids/sids.cfm>

SIDS Alliance/First Candle

<http://www.sidsalliance.org> or <http://firstcandle.org>

SIDS International

<http://www.sidsinternational.org/>

U.S. Consumer Product Safety Commission

<http://www.cpsc.gov>

Web-based Injury Statistics Query and Reporting System (WISQARS)

<http://www.cdc.gov/ncipc/wisqars>

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SIDS, Sleep, and Suffocation: The Facts

Course Exam

After studying the downloaded course and completing the course exam, you need to enter your answers online. **Answers cannot be graded from this downloadable version of the course.** To enter your answers online, go to e-leaRN's Web site, www.elearnonline.net and click on the Login/My Account button. As a returning student, login using the username and password you created, click on the "Go to Course" link, and proceed to the course exam.

1. A metabolic disease currently under study and implicated in 1/100 SIDS cases is:
 - a. PKU
 - b. MCAD
 - c. MSUD
 - d. galactosemia
2. Apnea and Bradycardia (A & B) monitors can prevent SIDS.
 - a. True
 - b. False
3. Maternal risk factors for SIDS include age under 20, late or no prenatal care, perinatal smoking and substance abuse.
 - a. True
 - b. False
4. The risk of SIDS is twice the national rate for which cultural/ethnic group?
 - a. Chinese Americans
 - b. Pacific Islanders
 - c. African Americans
 - d. Latinos
5. Methods to reduce the risk of infant suffocation include all of the following **EXCEPT**:
 - a. Soft objects such as pillows, loose bedding, stuffed animals, sheepskins, etc. should be kept out of an infant's sleep environment.
 - b. The mother-infant dyad should share the same bed.
 - c. Babies should be placed to sleep in a crib that conforms to the safety standards of the Consumer Product Safety Commission (CPSC).
 - d. Infants should be placed to sleep in the supine position.
6. Suffocation is the leading cause of accidental death in infants.
 - a. True
 - b. False
7. Which of the following are known risk factors with bedsharing?
 - a. Sleeping with siblings
 - b. Maternal alcohol use
 - c. Fatigue
 - d. All of the above

8. Although co-bedding is sometimes seen as controversial in the US, it is the norm in many non-western cultures.
 - a. True
 - b. False

9. In the US co-bedding may be viewed as promoting emotional dependence.
 - a. True
 - b. False

10. Healthcare providers can work to reduce the incidence of SIDS and infant suffocation by:
 - a. Educating themselves
 - b. Educating the public
 - c. Neither A or B
 - d. Both A and B