

## Risk Factors for Sudden Infant Death Syndrome and Sleeping Practices in Korea

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Sudden infant death syndrome (SIDS) in Korea remains a poorly-understood subject for both professionals and the public. Recent reports have emphasized ethnic differences in SIDS rates, suggesting that making adjustments in child-rearing practices may contribute substantially to SIDS reduction. Two of the three major risk factors for SIDS-vulnerability of the infant and exogenous factors-need to be understood in particular depth due to their broad scope and sociocultural grounding. This paper presents substantial issues regarding preterm birth and male gender on infants' vulnerability to SIDS in Korea. Practices of caring for healthy infants are addressed in the context of sleeping practices, including sleeping position, bedding arrangements, sleeping on the floor, the back-to-sleep position, high indoor temperatures and ondol floor heating, and swaddling. Professional and social awareness about how to reduce SIDS should be raised by promoting a better understanding of risk factors in the context of ethnic and cultural variations in child-rearing practices.

**Key words:** Sudden infant death syndrome; Cultures; Infant care; Suffocation

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### INTRODUCTION

Sudden infant death syndrome (SIDS) refers to infant deaths during sleep where the cause is unknown despite a thorough exploration of the infant's clinical history, an investigation of the death scene, and an autopsy [1]. In 2017, the United States (US) Centers for Disease Control and Prevention (CDC) reported that of 22,335 infant deaths, 1,363 were due to SIDS [2]. In the United Kingdom (UK), the rate of SIDS in 2016 was 31 per 100,000 live births (0.31/1,000) [3]. In Korea, it is difficult to obtain accurate estimates of the frequency of SIDS because it has not yet become standard practice to conduct death scene investigations and to explore the infant's clinical history. Nonetheless, in data from Statistics Korea, the incidence of SIDS per 1,000 infants was estimated to be 0.1 in 2007 and 0.2 in 2018 [4]. In a previous study that attempted to estimate the incidence of SIDS, a rate of 0.56 per 1,000 infants was calculated for a 2-year period (1997~1998) using a combination of data from the Korean Medical Insurance Corporation, data from medical facilities, and data from the Korean National Statistical Office [5]. A more recent estimation was 0.22~0.36 per 1,000 infants for sudden unexplained death, including SIDS, based on 13 years of autopsies conducted by the National Forensic Service (NFS) of Korea [6]. Nonetheless, limitations of previous reports include issues inherent to secondary data analysis, the fact that autopsies were performed in very limited cases, and the reliability of SIDS

diagnoses that were frequently made without an investigation of the infant's clinical history or death scene. However, these limitations have been inevitably encountered in research on this topic, since there are almost no reliable data on the incidence of SIDS or factors related to SIDS in Korea, as the aforementioned three preconditions for a definitive diagnosis (review of the infants' clinical history, death scene investigation, and autopsy) have not been fully implemented.

In Korea, increasing attention has been directed towards whether cases of infant mortality are properly classified as SIDS, since SIDS is the factor that makes the third-largest contribution to the infant mortality rate (IMR), following congenital malformations and preterm birth (PTB) [4]. The IMR is of particular concern in Korea, as its total fertility rate (TFR) has plunged to 0.98, the lowest rate in the world [7]. Since it is difficult to satisfy the three conditions used to define SIDS and because the contextual meanings of SIDS and sudden unexplained infant death (SUID) may overlap, it is common to use SIDS and SUID interchangeably when cases occur. News sources apply the terms "sudden infant death" or "unexplained infant death" to deaths of infants or young toddlers in unfamiliar circumstances, even including deaths at daycare centers. Furthermore, child health researchers and clinicians in Korea have started to pay attention to the risk factors of SIDS or SUID through collaborative research with forensic pediatric specialists. Minimal research has investigated the risk factors for SIDS in Korea, except for a few reports from the NFS [5,6]. SIDS in Korea remains a poorly-understood subject for both professionals and the public, given the absence of systemic reporting guidelines and protocols for possible SIDS cases and the lack of thorough investigations, including autopsies, of cases that occur. Considering that SIDS occurs during sleep, sleeping practices and child-rearing practices (CRP) are subjects of inquiry as exogenous risks of SIDS. However, to establish more specific precautions, it is necessary to adopt risk factors or guidelines for SIDS suitable for the domestic context due to the sociocultural and environmental nature of CRP. There is a need for child health professionals to understand the deep-seated issues and risk factors of SIDS in the context of child care and sleeping practices in Korea.

## Risk Factors for SIDS in Korea

The well-known risk factors of SIDS include PTB, recent infections, certain genetic polymorphisms, male sex, the age range of 2~4 months, and exposure to smoking and alcohol, as well as environmental factors, such as sleeping in a prone or lateral position or in a shared bed, over-bundling, socioeconomic vulnerability, a high indoor temperature, and the cold season [8]. These risk factors can be classified into three cate-

gories, yielding a triple risk model: a vulnerable infant (e.g., genetic/health problems), a critical developmental period (e.g., 2~4 months of age) and exogenous stress (e.g., sleeping practices and socioeconomic status) [9]. While SIDS could be theoretically explained in terms of complex interactions of risk factors, each death from SIDS occurs when complex overlapping factors or a single toxic trigger exceeds the viability of an infant in a specific set of circumstances. Therefore, it is necessary to explore whether and how the risks of SIDS reported in one society can be applied in another society.

As a result of tenacious efforts to reduce the risk factors for SIDS, such as the Safe to Sleep (formerly Back to Sleep) campaign, US statistics reported a drop in the SIDS/SUID rate, followed by a stabilizing trend over the most recent 2 decades [10]. A similar phenomenon was also observed in the UK, as the rate of sudden, uncertain, or unexplained infant deaths decreased over the course of 10 years, hand-in-hand with SIDS risk prevention campaigns, and then seemed to stabilize, despite a striking level of ethnic variation [3]. In Korea, a similar campaign against SIDS was conducted by the Korea Centers for Disease Control (KCDC) in 2007 [11] and 2011 [12], emphasizing the need for safe sleeping practices (including position and bedding materials). A recent analysis of UK data reported the lowest rate in eastern Asian immigrants and five-fold ethnic variation in SUID among ethnic groups in a national birth cohort (2006~2012); this magnitude of variation does not seem to be attributable to well-known risks such as PTB, infant sex, maternal age, or socioeconomic deprivation [13]. These data suggest that some risk factors for SIDS may be sensitive to culture-specific infant-rearing practices, especially considering that SIDS occurs during sleep.

Two aspects of SIDS risk factors, vulnerability of the infant and exogenous factors, need to be understood in particular depth due to their broad scope and sociocultural grounding. The concept of vulnerability of an infant implies not only biological susceptibility, but also the presence of sociocultural insecurity that may hamper infant survival and growth in a given society. Among exogenous factors, sleeping practices are among the most urgent issues, as evidenced by the success of safe sleeping campaigns for SIDS reduction throughout the world [14]. SIDS occurs during sleep, and sleeping practices clearly reflect CRP in a cultural-evolutionary sense. Therefore, the safety (or lack thereof) of sleeping practices in terms of SIDS should be more sensitively explored with reference to sociocultural factors such as housing structures and bedding materials. This paper intends to address risk factors for SIDS, with a special emphasis on the vulnerability of infants and sleeping practices in the sociocultural context of Korea, and by doing so, hopes to expand the understanding of ethnic variations in SIDS among different cultures. To avoid excessive ex-

planatory verbiage related to SIDS or analogous cases, the term “SIDS” is used throughout the paper for cases of any infant death without a definite cause of death, including unexplained deaths.

## 1. Vulnerability of the Infant as a SIDS Risk Factor

An infant's vulnerability to SIDS results from factors including, but not limited to, health problems and ethnic or genetic characteristics. Health-related SIDS risk factors include PTB, being 6 months of age or younger (peak at 2~4 months), low birth weight, a low Apgar score at birth, exposure to smoking and alcohol, cardiac arrhythmia, and recent viral infections [15]. Each of these factors has a different mechanism, but they are intertwined and are exacerbated by infants' immature immunity and poor physiological regulation.

Especially in rapidly modernized societies with old traditions, such as Korea, the scope and impact of infants' vulnerability may be substantial, but it may be challenging to persuade parents and health professionals to truthfully divulge information relevant for SIDS [6]. For instance, PTB exemplifies the complexity of SIDS risk. Preterm infants (e.g., those born at 32 weeks of gestation) tend to have a low birth weight and a low Apgar score, and are therefore more susceptible to viral infections, including respiratory tract infections, during early childhood [16]. However, because medical records are not yet linked between hospitals and clinics in Korea, pediatric professionals may not recognize PTB as the ultimate basis for an infant's vulnerability to frequent respiratory problems, in addition to proximate causes such as respiratory syncytial virus, unless the accompanying caregiver (most often the mother) voluntarily discloses the infant's birth history. When an infant born at 32 weeks turns 6 months old, his or her actual corrected age is 4.0 months, which overlaps with the critical period of 2~4 months of age in SIDS risk models. Furthermore, mothers' direct and indirect exposure to smoking and alcohol before, during, and after pregnancy needs to be assessed because these are well-known risk factors of PTB, infant health problems, and SIDS separately and in combination [8,15]. Recent Korean birth statistics have indicated rapid increases in PTB, by 7.6%p in 2018, a twofold increase compared to a decade ago [17]. The fact that countries with a high incidence of PTB, such as the US or Europe, pay close attention to factors related to PTB as a primary contributor to SIDS has major implications for the prevention and management of SIDS in Korea.

Another example of cultural complexity in vulnerability for SIDS relates to male sex as a risk factor. As in many traditional societies, in Asia and elsewhere, Korea has long had a patriarchal culture favoring sons over daughters. However, since

the TFR of Korea has remained in the range of roughly 0.98~1.10 for about 2 decades [7], implying one child per parental pair, it is not certain that the traditional bias towards sons still exists in modern Korea. However, even if the bias towards male infants still exists, it may not be easy to observe or separate the vulnerability of male infants from other risks for SIDS in modern Korea. Recent data from the NFS reported that male infants accounted for 55.7% of 341 cases in a 1-year review of autopsies in cases of child death with a postmortem diagnosis of abuse, homicide, SUID, or undiagnosed death [18]. In 39 SUID cases (11.4%) from 341 autopsies, 51.3% were male infants with a mean age of 96 days old, and the most frequent persons with reasonable suspicion were the mother (66.7%) and father (33.2%) regardless of whether there was definitive positive evidence for charging them. These findings suggest that male sex is not a protective factor against SUID in modern Korea. It might be an oversimplification to develop a hypothesis from data collected in a relatively short period, such as the NFS data from Korea, regarding whether the cultural bias towards male infants has faded or remains present, and whether it has an impact on SIDS, especially without a thorough adjustment for other mediating variables. Instead, the NFS findings provide further support for the necessity of exploring sociocultural and family dynamics regarding infant sex to understand the mechanism through which male sex may promote vulnerability to SIDS, in addition to the possibility that male infants may have vulnerabilities to the biological mechanisms underlying SIDS or to factors such as the sex of the assailant and the presence and sex of a sibling.

## 2. Sleeping Practices as Infant Care

A defining factor of SIDS is that it occurs during sleep. Well-known risk factors related to sleeping practices include prone and lateral positions, co-bedding, and the improper use of bed sheets or supplementary sheets, cloth, swaddling, and mattresses [15]. It is important to seriously consider whether these factors are real contributors to SIDS, and if so, through which mechanisms. Below, a detailed analysis is presented of risk factors relating to aspects of infant care practices in modern Korea.

### 1) Sleeping position

The prone position is known to be associated with SIDS, particularly when soft bedding is used, as it increases the likelihood of suffocation in infants who cannot easily lift their head or change their position to avoid air pockets where carbon dioxide is concentrated in the hollows of soft bedding or other comforters around them [8,15]. As well, the prone position may restrict the movement of the arms and legs, making

it difficult for infants to wake themselves up [6]. The lateral position also poses similar risks to the prone position. Thus, the relationship between sleeping position and SIDS may reflect two underlying factors: an ability to lift or turn the face in the prone position and inappropriate bedding arrangements causing suffocation or air pockets.

Infants' ability to change the position of their head or body is associated with their growth, development, and overall health status. That is one of the reasons why the critical period in the triple risk model of SIDS has the highest risk at 2~4 months of age, extending to 6 months old [9]. This fact has unique implications for prematurely-born infants. For instance, an infant aged 6 months may have an actual corrected age of just 4 months if he or she was born at 32 weeks of gestation. Thus, the integral development of the physiological ability of such a baby to move his or her head and limbs or to stimulate himself or herself is expected to be immature, like that of a 4-month-old, despite an actual birth age of 6 months old.

The improper use of bedding materials, such as sheets or pillows, may block an infant's breathing, increasing the risk of suffocation or asphyxia as an independent risk factor or in addition to the infant's inability to change his or her head or body position during sleep [8,14,15]. Furthermore, because pillow usage for infants is much more popular in Asian cultures than in Western societies [19], it may be difficult to distinguish unintentional suffocation from SIDS unless the SIDS criteria are satisfied.

## 2) Bedding arrangements and sleeping on the floor

Bedding practices vary by child-care philosophies, sleeping habits, and home architecture [20]. A soft mattress has frequently been reported as a risk factor in Western countries and prominently included in campaigns against SIDS. However, this factor is unlikely to be directly applicable in the Korean context, since Koreans generally prefer harder bedding such as floor-like surfaces, which makes co-sleeping easy [20]. In Western countries, people rarely sleep on the floor, and their bodies tend to be relatively large and heavy. Particularly in cases of co-sleeping on a single mattress, it is highly likely for adults to cause the bed to sink or for an adult's body to exert undue pressure on an infant. Additionally, sleeping places such as couches and sofas may be significant contributors to SIDS when a bed is not available [8,15]. However, Koreans are used to sleeping on the floor, which provides a wide sleeping surface for several persons [20,21]. Even when sleeping on a bed, Koreans generally use very firm mattresses with surfaces made of wood, red clay, or stone. Such beds do not pose a risk of the mattress sinking.

Moreover, in Korea, people take off their shoes at home, frequently change between sitting and lying positions, and may

sleep either on the floor or in a bed. In such circumstances, it is easier for the parents and baby to sleep in the same room (i.e., 'rooming-in' rather than co-sleeping); these cultural patterns may have a preventive function against SIDS [21]. However, regardless of rooming-in, if an infant and other persons share bedding materials (e.g., sheets or pillows) on the floor in the same room, which is also common in Korea [20,21], there may be an increased risk of suffocation from another person's body or sheets and pillows. A study of 171 autopsy-based cases of SIDS reported that sleeping on the floor (64.3%) was more common than sleeping in an adult bed (25.7%) [20]. Thus, caution should be used when generalizing certain risk factors for SIDS (e.g., soft bedding, bed sharing, or co-sleeping) that have been reported in Western countries, which have different housing environments and sleeping cultures from Korea. Empirical investigations should be conducted in suspected SIDS cases in Korea to determine whether the bed actually could have sunk to the extent of blocking an infant from breathing, particularly during co-sleeping; whether air pockets could actually have formed; and whether the parents and the baby actually engaged in co-sleeping on a mattress.

## 3) Back-to-sleep practices in Korea

To present any unintentional injuries related to sleep, many efforts have been made to eliminate risk factors related to sleeping practices and to promote safe sleeping practices for infants, such as the Safe to Sleep campaigns that have been conducted in Western societies, including the US [22]. The American Academy of Pediatrics has promoted the 'back-to-sleep' position to the public as the optimal sleeping position for reducing SIDS [14,15]. This has helped to reduce SIDS and is being applied in many countries in regions including Europe and Asia [23]. In Korea the significance of safe sleeping as a protective factor against SIDS has been emphasized by the KCDC [11] and the NFS [12]. The proper implementation of this guidance requires the utmost care, because sleeping positions are a part of sleeping culture, and each culture has its own characteristic style of housing and bedding arrangements; moreover, these issues are closely associated with cultural expectations and practices regarding infant care. It is not certain that the safe sleeping instructions from the KCDC and NFS have reached full public awareness in terms of its impact on SIDS.

'Back-to-sleep' in the US literally means lying on one's back, which is logical in the context of the sleeping culture of the US [15]. The corresponding term in Korea is 'laying a baby flat', and 'laying somebody flat' in Korean sleeping culture can be interpreted as laying a baby's head and body straight, or, in other words, laying a baby with his (or her) face toward the ceiling. Furthermore, when 'laying a baby flat' is in-

terpreted as straightening the whole body by extending the upper extremities, caregivers might implement this advice by tightly swaddling a baby's hands and feet to prevent movement, and laying him (or her) straight, which might result in over-bundling. However, 'back-to-sleep' does not specify the direction of the head or include any measures to restrict the movement of a baby's limbs. Therefore, a more comprehensive understanding is needed of the context and application of the 'back-to-sleep' position to reduce SIDS in the sleeping culture of the US, and care should be taken not to represent it as a partial correction of the sleeping position that should be uniformly applied in Korea.

#### 4) High indoor temperatures and ondol floors

Meanwhile, high indoor temperatures are also known to be an environmental factor that contributes to SIDS [15]. This factor may be significant in Korea, given certain aspects of domestic housing structure and infant care culture. Relevant Korean cultural practices include sleeping on the floor and using ondol floors (a Korean floor heating system). Furthermore, Koreans take off their shoes when entering inside the house, which allows direct contact with the warm ondol floor during sleep. Since Koreans regard warmth and circulation as the basis of health based on traditional oriental medicine, they consider it important to protect the warmth of the body and prefer to maintain direct contact with a warm floor [24]. A healthy infant can maintain a normal body temperature with clothes or bedding that lightly cover his or her body surface area at a comfortable room temperature of 24~26°C. If the indoor temperature is too high in a modern residential space, when an infant is laid down on a warm ondol floor directly, or a supplementary heater or electrical heating mattress is applied to an infant during sleep, the infant's body temperature could easily increase [6]. Hyperthermia in infants can inhibit metabolic activation and breathing as part of disturbances of the brain's temperature regulation [14,25].

As humans are homeothermic by nature, the human body has various adaptive mechanisms to maintain a normal body temperature despite thermal variations in the environment. Several studies of human body temperature and climatic adaptations have reported that ethnic groups that have evolved and adapted to warm climates and cold climates, respectively, show different patterns of sensitivity and adaptation to coldness and warmth [26]. Abrupt exposures to a very warm residential temperature in a modern house may be a mismatch for those whose thermal adaptation mechanism evolved in a cold environment. In this context, the fact that SIDS was most common among Native Americans and Alaskans in recent US statistics [13] may be hypothetically associated with ethnic variation in thermal adaptations to envi-

ronmental temperatures. For analogous reasons, it cannot be ruled out that high indoor temperatures may be a risk factor for SIDS that requires particular attention in Korea, given its location in northeastern Asia, along with the practice of sleeping on warmed floor surfaces such as ondol floors.

#### 5) Swaddling

A noteworthy phenomenon related to infants' sleep in Korea is swaddling, which refers to the habit of wrapping infants tightly. In Korea, almost all newborns are born in hospitals [27], and the neonatal units of hospitals and clinics customarily swaddle newborn babies to promote their stability by restricting unnecessary movements. A further intervention that helps restrict unnecessary movements and promotes stability is nesting, which provides newborns with a physical environment similar to the intrauterine environment. Furthermore, considering real-world circumstances in neonatal care clinics and postnatal care centers, which rarely have a rooming-in system (where a newborn and mother stay in the same room), the practice of swaddling and tight nesting is often performed to promote work efficiency in neonatal units that care for newborns collectively.

In hospitals and clinics of Korea, swaddling is a type of short-term domestic practice adopted in response to real-world conditions. After discharge from the birth clinic, swaddling is considered to be a good habit that should be continued in the context of general infant care [28]. Commercialized swaddling sheets with brands like "Swaddle Me", "Swaddle Up", or "Pouch" are popular in the market. They are promoted based on the idea that restricting the movement of infants' hands and feet calms them when they are startled, helps them sleep soundly, and prevents the Moro reflex. Some companies even advertise their products as preventing plagiocephaly and SIDS by keeping the infant's head and body straight in the supine position. Swaddling or tight nesting to limit the movement of the body and limbs during sleep may both promote calmness and stabilization and inhibit self-arousal [15,29]. A well-known etiology of SIDS is failure or suppression of autonomic and subcortical arousal during sleep [29]. The empirical advantages and disadvantages of swaddling have not been well characterized, and it has not been established as the standard of care for infants. While professionals appreciate the purpose of swaddling, they clearly state that swaddling for sleep should be practiced in safe manner and stopped as soon as babies begin to roll over [30]. Therefore, close attention should be paid to assess the risks and benefits of swaddling or tight nesting, individually and collectively and for short-term versus long-term habitual use, in terms of infants' activities and ability to arouse themselves in combination with various sleeping practices.

## Suggestion

SIDS refers to deaths with an unknown cause; therefore, diseases, abuse, and accidents must be excluded as the cause of death for SIDS to be diagnosed. Recent reports have emphasized ethnic differences in SIDS rates [25], suggesting that making adjustments in CRP may substantially contribute to SIDS reduction. Therefore, the risks of SIDS need to be understood in the extended context of CRP, which are highly multifaceted phenomena involving both biological and socio-cultural factors.

Sleeping practices comprise a comprehensive, collective cultural scheme that has evolved in a given environment, reflecting the long-term accretion of social values, relations, roles, and structures. Although the content of each factor in the triple risk model of SIDS varies depending on one's perspective and SIDS occurs as a result of the complex interaction of various risk factors, sleeping practices are the most promising target for interventions and education to prevent SIDS. In particular, the sociocultural understanding of infants' vulnerability and sleeping practices may be a starting point to explore the sensitivity of SIDS risk factors, and possibly to adapt SIDS reduction strategies cross-culturally. This paper presents substantial issues regarding SIDS in the context of sleeping practices, including sleeping position, bedding arrangements, sleeping on the floor, the back-to-sleep position, high indoor temperatures and ondol floor heating, and swaddling. These factors operate in the context of Korean residential circumstances and are modified through interactions with other risk factors. On this basis, we make the following three suggestions to better understand SIDS and to reduce its occurrence.

First, a checklist should be developed for the comprehensive investigation of significant factors in possible cases of SIDS. The core items that should be investigated include detailed information on the birth and a history of the infant's health, including PTB, age in months (including the corrected age), body measurement data at birth, and current data, including weight, height, and head circumference. As PTB and low birth weight are major risk factors for SIDS, information on these parameters must be collected when the police or emergency department starts an investigation. In addition, the following information is very important: gender of siblings, birth order, age of each parent, genetic distance between family members, developmental status, circumstantial aspects of each case (position, body shape, diaper, vomit, etc.), the relevant biospecimens (vomit, diaper, etc.), and feeding.

Second, active policy changes are suggested to clearly identify other causes of death that can be confused with SIDS. For example, in developed countries, although PTB (a major risk

factor of SIDS) has increased, SIDS itself has not become more common [13,14]. This is because these countries pay attention to systematically monitoring the incidence of SIDS and related phenomena by identifying non-SIDS cases via thorough investigations and explorations of similar cases. Sudden infant death has emerged as a topic of major interest in Korea, particularly in light of the current low birth rate, as childcare has become a national policy theme. Safety issues have become more prominent as a social concern due to a series of widely-publicized infant death accidents at daycare centers. Although SIDS is conceptually distinct from SUID due to causes such as suffocation, and therefore requires a different approach, careless assumptions about the cause of death and unrefined one-off media communications cloud the public's understanding of infant deaths at daycare centers, hinder taking a proper approach to such deaths, and obscure the true reality of SIDS. Without a systematic approach of exploring the factors related to infant deaths at daycare centers, there is only an irrational collective interest in specific cases, and a single risk factor could be exaggerated and distorted as if it were the main cause of such cases. Therefore, it is suggested that institutions should implement thorough and systematic investigations of possible cases of SIDS based on autopsies conducted by medical professionals and appropriate assessments of infants' health status, growth, and development. Additionally, a professional education program on SIDS needs to be systemically adopted for child care professionals with structural guidelines to reduce SIDS including safe sleeping practices appropriate for the Korean cultural context.

Third, the management of SIDS and efforts to raise the public's awareness about the reduction of SIDS require delicate strategies that specifically target factors related to domestic infant care and sleeping culture. In other words, a campaign should be constructed that is more appropriate for the domestic environment based on a comprehensive assessment of the evidence of risk, instead of emphasizing only specific sleeping positions as risk factors for SIDS. Such a strategy should include the use of sophisticated terms and slogans, as well as appropriate images, as done by the American SIDS Institute, The Lullaby Trust in the UK, or Red Nose in Australia.

To conclude, SIDS is a very complex, tragic phenomenon that should be understood from the viewpoint of infant care culture. As such, this study aimed to investigate infant-related factors and environmental risk factors of SIDS in the context of sleeping practices and to suggest that social awareness about how to reduce SIDS should be raised by presenting the risk factors that need attention in Korea. A comparative analysis of the risk factors of SIDS in a context where the domestic discourse on SIDS has yet to fully develop has many limitations. Since domestic field surveys and research related to SIDS are

still in their early stages, the analysis in this article is limited to well-known risk factors and hypothetical problem-posing. Nevertheless, the authors hope that the conclusions of this study regarding the vagueness, contradictions, and deficiencies of SIDS research will promote more discussion and research, and that this study will serve as a starting point for initiatives to reduce SIDS, as well as a basis for offering sincere condolences and care to families affected by SIDS.

### Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

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