ORIGINAL RESEARCH ARTICLE

Evaluation of Sleep Patterns and Practices in Healthy Indian Infants: Is there a Cultural Difference?

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Abstract

Background: Consolidated sleep through the night plays a critical role in the growth, development, and behavior of a child. There is a need to understand sleep practices in the region to enable parent counseling and developing guidelines for the healthy Indian infants.

Objective: The objective of this article was to evaluate sleep patterns and practices in healthy Indian infants.

Study design: The cross-sectional study method was used in this study.

Participants: Infants aged 1–18 months are the participants of the study.

Intervention: Survey using the Brief Infant Sleep Questionnaire (BISQ) was validated as the intervention activity conducted in the study.

Outcomes: Duration of night sleep, day sleep, and total sleep time; average bedtime; number and duration of night awakenings; position and location of sleep; sleep initiation process; and parental perception of sleep problem are the final outcomes obtained from this study.

Results: The average bedtime was 21:45 p.m., mean total sleep time 11.65 (±1.59) hours, night sleep time 8.58 (±1.70) hours and day sleep time 3.06 (±1.59) hours. The mean number of awakenings was 3.32 (±1.57). 43.6% of the babies slept on their back and 88% of the babies slept in their parents' bed. 45.6% of the babies needed to be fed, 31.6% rocked, and 15.2% held to sleep. 41.6% of the parents perceived their baby to be having a sleep problem. The babies whose parents perceived no sleep problems, slept longer at night (p <0.001), had lesser night awakenings (p <0.001) and lesser nocturnal wakefulness (p <0.001) compared to those with a serious to small sleep problem.

Conclusion: Current sleep practices in India are different than those recommended for Western infants and follow cultural norms. Early problematic sleep habits can become a chronic problem. Early intervention is recommended to prevent that occurrence.

Keywords: Prevalence, Questionnaire, Sleep practice, Sleep quality.

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Introduction

Sleep issues in infants are a common problem presenting to pediatricians across the world.[1] Multiple night awakenings appear to be the most prevalent sleep issue in infants resulting in fragmented sleep.[2] Although consolidation of night sleep is a maturational process in the first year of life,[3] a significant number of babies may not achieve this goal. Cultural factors have been shown to play a role in child development, behavior, and sleep practices.[4] Hence, it is essential for pediatricians to be familiar with the local sleep practices to be able to adequately counsel parents to help resolve these issues. This study was undertaken to address the gap in the literature available on the sleep patterns of healthy infants in India.

Methodology

This is a cross-sectional survey conducted in a tertiary care children's hospital in Bengaluru city for 12 months. All healthy babies between the ages of 1–18 months who were brought for routine vaccination were included in the study, following parental consent. The Brief Infant Sleep Questionnaire (BISQ) (Table 1) validated for use in children between 0 and 36 months[5] was completed by a parent. Of the 1,087 study subjects, children were divided into three age-groups 1–6 months (n = 323), 7–12 months (n = 542), and 13–18 months (n = 222) with male preponderance (M/F: 631/456).

Statistical Analysis

Statistical analysis was carried out using Microsoft Excel version 2016. Quantitative variables were compared using Z-test between the groups of infants with perceived sleep problems and the groups of infants with no perceived sleep problem. The comparison of means between the three age-groups was made using one-way ANOVA. Qualitative variables were compared using the Chi-square test. A p value of <0.05 was considered statistically significant. Maternal education and working status were removed as variables in the analysis as no difference was seen on regression analysis.

Results

Table 1 shows the sleep variables of infants according to the three age-groups. The overall average bedtime was 21:45 (9:45 p.m.), with

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no significant difference between the different age-groups. The mean duration of nighttime sleep, daytime sleep, and total sleep over 24 hours was 8.58 hours, 3.06, and 11.65 hours. There was no significant difference ($p = 0.3$) in the nighttime sleep among the different age-groups, though there was a significant decrease in daytime sleep and total sleep time as a child got older. There was a mean of 3.32 (±1.57) awakenings noted during night sleep in the study population with no significant difference across age-groups ($p = 0.69$). The mean duration of wake time during the night was 29.32 (±32.32) minutes, with 28.49 (±21.89) minutes being taken to put the baby back to sleep, with no significant difference across age-groups ($p = 0.06$).

Table 2 shows the sleep ecology and behavior of infants in our study group. The most common sleep position of babies was found to be on the back (43.6%) followed by the side (38%). Eighty-eight percent of the infants were found to co-sleep in their parents' bed, with only 10.1% sleeping in a crib in the parents' room and 1.2% in a crib in a separate room. Among the babies from 13–18 months, 3.6% were found to sleep in a crib in their sibling's room. The most common method of initiating sleep was found to be by breastfeeding in 45.6% followed by rocking the baby in 31.6%. Only 1.1% of the parents allowed the baby to initiate sleep on their own. There was no significant difference found between the different age-groups in the various sleep practices.

A total of 41.6% of the parents felt that their baby had a sleep problem with 19.2% who felt it was a serious problem. Those with babies between 1 and 6 months perceived fewer sleep problems compared to those with babies aged 7–18 months. As shown in Table 3, the babies whose parents perceived that their sleep was not an issue at all, tended to sleep for a longer duration at night ($p < 0.001$), have lesser night awakenings ($p < 0.001$) and lesser nocturnal wakefulness ($p < 0.001$) compared to those in who had a

Table 1: Sleep variables of infants according to the age distribution

Sleep variables studied	*0–6 months (n = 323) Mean (SD)*	*7–12 months (n = 542) Mean (SD)*	*13–18 months (n = 222) Mean (SD)*	*Overall (0–18 months) (n = 1087)*	*p value*
Average bedtime (HH:MM) (range)	9:51:01 p.m. (6:30 p.m.–2:30 a.m.)	9:37:24 p.m. (6:30 p.m.–2:30 a.m.)	9:57:50 p.m. (6:30 p.m.–2:30 a.m.)	9:45 p.m. (6:30 p.m.–2:30 a.m.)	0.12
Duration of night sleep (in hours)	8.47 (1.74)	8.62 (1.64)	8.69 (1.82)	8.58 (1.70)	0.30
Duration of daytime sleep (in hours)	4.68 (1.28)	2.75 (1.00)	1.47 (1.04)	3.06 (1.59)	<0.001
Total sleep time for 24 hours (in hours)	13.29 (1.47)	11.36 (1.86)	10.15 (1.81)	11.65 (2.12)	<0.001
Number of awakenings (#)	3.35 (1.42)	3.34 (1.61)	3.24 (1.70)	3.32 (1.57)	0.69
Duration of nocturnal wakefulness (in minutes)	29.72 (29.41)	27.0 (26.33)	34.41 (46.22)	29.32 (32.32)	0.02
Time taken to put baby back to sleep (in minutes)	29.21 (29.82)	27.0 (15.83)	31.0 (20.84)	28.49 (21.89)	0.06

Table 2: Sleep ecology and behavior according to the age

	0–6 months (n = 323) % (n)	*7–12 months (n = 542) % (n)*	*13–18 months (n = 222) % (n)*	*Overall (0–18 months) (n = 1087) % (n)*
Sleeping position of the baby at night				
• On his/her belly	12.4% (40)	19.5% (106)	24.3% (54)	18.4% (200)
• On his/her side	31.9% (103)	48.1% (261)	22.0% (49)	38% (413)
• On his/her back	55.7% (180)	32.4% (175)	53.7% (119)	43.6% (474)
Sleeping arrangement				
• Infant crib in a separate room	0	2% (9)	1.8% (4)	1.2% (13)
• Infant crib in parents' room	13% (42)	10% (54)	6.4% (14)	10.1% (110)
• In parents' bed	87% (281)	88% (479)	88.2% (196)	88% (956)
• Infant crib in sibling's room	0	0	3.6% (8)	0.7% (8)
• Others	0	0	0	Nil
Sleep initiation process				
• By feeding	45.8% (148)	48.7% (264)	37.8% (84)	45.6% (496)
• By rocking the baby	30.0% (97)	27.3% (148)	44.1% (98)	31.6% (343)
• Being held	13.6% (44)	16.8% (91)	13.5% (30)	15.2% (165)
• In bed alone	1.5% (5)	0.6% (3)	1.8% (4)	1.1% (12)
• In bed near the parents	9.0% (29)	6.6% (36)	2.7% (6)	6.5% (71)
Parental perception of sleep problem				
• A very serious problem	16.4% (53)	19.7% (107)	22.1% (49)	19.2% (209)
• A small problem	13.6% (44)	24.5% (133)	29.7% (66)	22.4% (243)
• Not a problem at all	70% (226)	55.8% (302)	48.2% (107)	58.4% (635)

Table 3: Comparison of BISQ measures according to the severity of sleep problems perceived by the respondent

Sleep measures	*A very serious problem*	*A small problem*	*Not a problem at all*	*p value*
Nocturnal sleep duration (in hours) Mean ± SD	7.05 (2.0)	8.84 (1.08)	9.00 (1.50)	$p < 0.001$
Nocturnal wakefulness (in hours) Mean ± SD	0.99 (0.87)	0.43 (0.45)	0.35 (0.26)	$p < 0.001$
Night awakenings (#) Mean ± SD	4.40 (1.71)	3.37 (1.77)	2.95 (1.25)	$p < 0.001$
Daytime sleep duration (in hours) Mean ± SD	3.43 (2.05)	2.73 (1.35)	3.07 (1.49)	$p = 0.86$
Sleep-onset time (in hours) Mean ± SD	21:26 (2.39)	21.41 (2.17)	21.53 (2.07)	$p = 0.5$

serious to small sleep problem. There was, however, no significant difference in their daytime sleep ($p = 0.86$) and bedtime ($p = 0.5$).

Discussion

This is one of the first studies to focus specifically on sleep practices in young Indian children. We report a shorter duration of sleep in Indian infants as per the American Academy of Sleep Medicine (AASM) recommendations as well when compared to their Western counterparts. Similar findings were reported by Mindell et al.[6] on comparing sleep parameters between Asian and Caucasian children. Asian children had a later sleep time and a shorter nighttime sleep duration associated with normal duration and number of daytime naps. This resulted in a decrease of 1 hour of total sleep time in Asian children. However, sleep duration recommendations are based on only consensus statements and more evidence-based research is needed to determine the actual requirement of sleep in children from different populations.[7]

Other significant findings in our study subjects included a higher number of nocturnal awakenings and a later sleep time in comparison with their Western counterparts. Furthermore, we note that parents who reported that their child had a serious sleep problem had a significantly higher number of night awakenings, a shorter duration of night sleep, and longer nocturnal wakefulness. Hence, night awakenings are an important concern for pediatricians to address as they are common and interfere with consolidated sleep in infants.[8] Parents are affected and judge the quality of their infant's sleep by the frequency of night awakenings.[9]

Eighty-eight percent of the babies in our study were found to co-sleep in their parents' bed and only 10% in a crib in the parents' room. This is a significantly high prevalence of co-sleeping, when compared to 11.8% in Caucasian and 64.6% in other Asian communities.[6] Although a study by Bruni et al.[10] demonstrated that infants who sleep in their parents' bed had more number of awakenings than those who slept on their own, other studies have shown that it may not influence the quantity or quality of sleep if practiced habitually.[11] We also found 18.4% of the babies sleeping on their belly and 43.6% on their back. Infant sleeping position has shown to play a critical role in the prevention of sudden infant death syndrome (SIDS) in the Western world.[12] A study of African American mothers showed that only 43.7% of the mothers exclusively placed their babies on their back during sleep. This choice was determined by maternal educational status, doctor's advice, behavioral attitudes, and perceived control.[13] It is promising that despite the high prevalence of co-sleeping that we describe, the reported incidence of SIDS in India is relatively low. However, there is a need for awareness among Indian parents on encouraging babies to sleep on their back, which is a known modifiable risk factor for SIDS.[14] Further research is needed on the impact of co-sleeping on the quality of other sleep parameters[15] in Indian children by comparing them to infants who do not co-sleep.

A significantly high proportion of the infants in our study were found to depend on sleep props or associations for initiation of sleep. 45.6% were dependent on feeding and 31.6% on rocking to sleep. Only 7.6% of the infants in our study did not use any sleep associations and self-soothed on their own. Similar findings were seen in Israeli children where 23% were fed, 18.7% were held, and 14.8% were rocked to sleep.[5] He further found that babies who slept independently were seen to sleep longer during both night and day than babies who were dependent on any associations.[10] Hence, we postulate that the sleep associations or props could contribute to the shorter sleep duration and multiple night awakenings that we see in our study compared to their Western counterparts.

A large number of parents in our study reported their child to be having a significant sleep problem. Early problems with sleep in infants have been shown to be associated with parental stress, reduced sense of competence, maternal depression, poor physical health, and reduced quality of life.[16,17] Interventions for infant sleep problems have shown to improve parameters in these domains of parental well-being.[18]

This study demonstrates the cultural differences in infant sleep practices in India compared to the Western population and reiterates the need for pediatricians to be more aware, take a routine sleep history, and address infant sleep problems early with sleep coaching techniques. The recommended amount of sleep for pediatric population is derived from the consensus statement of the AASM guidelines.[19] Hence, there is a need to develop sleep guidelines specific to the Indian population based on existing cultural practices.

What is already known: Infant sleep patterns vary from region and culture. Understanding local sleep practices enables a pediatrician to counsel parents on infant sleep issues.

What this study adds: This study is one of the first to describe sleep patterns in healthy Indian infants. It demonstrates, a lower total sleep time compared to Western data, a high number of nighttime awakenings, a high prevalence of co-sleeping, and a perception of infant sleep problems by the majority of parents.

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