



What is the Sleep Pattern of Infants and Toddlers in the Iranian Population? An Epidemiological Study

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Sleep Sci 2023;16(3):e284–e293.

Abstract

Objective To identify sleep patterns and sleep behaviors in a group of infants and toddlers (0 to 36 months) in Iran.

Methods Parents and caregivers of 602 infants and toddlers in Iran completed a Persian translation of the Brief Infant Sleep Questionnaire. To assess the differences among the age groups, non-parametric statistical approaches such as the Kruskal-Wallis and chi-square tests were employed.

Results The infants and toddlers went to bed relatively late (22:30), and the median night awakening was 2 times (20 min). They most likely slept in the same room with their parents (55.5%), and commonly in the same bed (18.9%). They slept a median of 11.50 hours per day. A significant percentage of the parents felt that their child had moderate or severe sleep problems (22.4%). These children's sleep patterns had significant developmental changes, including decreased daytime sleep, reduced overall sleep, and increased sleep consolidation (reduced number and duration of night awakenings and increased overall sleep duration). The parents commonly used holding-and-rocking and bottle/breastfeeding to initiate infants' sleep and bottle/breastfeeding to resume their infants' sleep.

Discussion These findings provide reference data for professionals to assess sleep in children under 3 years of age and also supply knowledge about common parenting practices related to a child's sleep. Cross-cultural comparisons using the findings can offer new insights into the practices and behaviors of parents concerning infant and toddler sleep.

Keywords

- ▶ bedtime
- ▶ parents
- ▶ sleep patterns
- ▶ children
- ▶ culture
- ▶ nocturnal awakening

Introduction

In the early years of life, sleep problems among infants and toddlers are a very important source of concern.¹ It is estimated that 20 to 30 percent of children develop sleep problems in the first three years of life^{2,3} and these sleep problems can persist for years.⁴ Sleep disturbances in children seem to be related to their behavioral and cognitive problems⁵ and negatively affect social and emotional devel-

opment in infants and toddlers.^{6,7} It may also influence the health and especially the metabolic function of the child's body.⁸ The development of regular routines and habits in the newborn's initial months of life, which assist the infant to synchronize his or her circadian cycle with that of his or her family, is the first step in preventing infant sleeping problems.⁹

Various research and review studies have compared sleep indices and practices of young children in different

received
February 27, 2022
accepted
November 27, 2022

DOI <https://doi.org/10.1055/s-0043-1772804>.
ISSN 1984-0659.

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Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

countries^{10–12} and significant cross-cultural differences have been found. Except for a few studies,^{13–15} very little information is available on infant sleep habits in West Asia, at least in English. Also, as far as we know, there is no reference data on children's sleep in Iran and we could only find one study¹⁶ on sleep habits and sleep patterns of infants in Iran.

As a result of the scarcity of data on sleep patterns and behaviors in infants and toddlers in the Middle East, particularly in Iran, this study is exploratory and does not offer a hypothesis.¹⁷ However, the explicit goal of this study is to evaluate sleep patterns and sleep difficulties in a relatively large sample of Iranian infants and toddlers aged 0 to 36 months. Another purpose of this study is to find out how common specific parental interventions are during bedtime and night wakings.

Material and Methods

Procedure

The study design is descriptive epidemiological. Through an online informed consent form, all participants expressed their willingness to participate in the study. All the data were collected online; the participants completed a Persian translation of the expanded and revised version of the Brief Infant Sleep Questionnaire (BISQ) along with a demographic questionnaire including the parents' age, education, place of residence, and employment status. First, an online questionnaire was designed the link of which was widely sent through advertisements on social networks, and websites. In the advertisement, mothers were invited to complete a questionnaire on infant sleep and mothers' health. In addition, we added two questions about the amount of support that parents receive from their spouses, relatives, and the community. The ethics committee of the Research Institution of SAMT Organization has approved of this study.

Participants

Questionnaires were collected from October 2021 to January 2022. 626 questionnaires were collected, 15 of which were incompletely returned and could not be used. Also, 9 were completed by Iranians abroad: United States (3 people), Germany (2 people), Canada, Finland, Kazakhstan, and Iraq (1 person each). These questionnaires were removed, and finally, the data of 602 respondents was employed for data analysis. This data were collected as part of a larger project on the relationship between infant and toddler sleep patterns and maternal health. Parents and caregivers of infants and toddlers in Iran participated in this study. The age range of the infants and toddlers was between 0 and 36 months. The number of girls and boys was almost equal (girls = 47.8%), and most of the respondents were mothers (95.5%).

Questionnaires

Demographic Questionnaire

In this study, the demographic questionnaire included questions about the following: child's age, sex, and birth order, and respondent's relation to the child, education, occupation,

age, number of rooms in the house, city/town/village of residence, and contact information.

The Brief Infant Sleep Questionnaire-Revised (BISQ-R)

This questionnaire is a tool for measuring the sleep habits of infants and toddlers from 0 to 36 months. The participants were asked to describe their child's behavior over the last two weeks. In this study, an expanded and revised version of the questionnaire¹⁸ was translated and administered which included 33 items. A comparison of the scores obtained from previous versions of the questionnaire¹⁹ with objective tools such as actigraphy and sleep diary has confirmed its validity. Two qualified translators translated the questionnaire into Persian, and the translation quality was checked using the back-translation procedure. This questionnaire included two minor additions. First, we added a "futon" option to the items related to the child's sleeping place, and second, we added two items on social and family support: one on who assists the mother when she is unable to care for the child and the other on how much they perceive their spouse as their supporter in childcare.

Statistical Analysis

Shapiro-Wilk test showed that none of the numerical variables had a normal distribution. Therefore, the data analysis was performed based on the Kruskal-Wallis test, considering the child's age group as the independent variable. H values were adjusted for ties. Except for ►Table 2, where we reported the means and standard deviations, the median and interquartile range were used to determine the central tendency and dispersion. The Dunn-Bonferroni post hoc method was used to test the significance of the differences between each group. We used the chi-square test to compare age groups in nominal variables with the z-test for post hoc comparisons. The findings were considered significant if $P < 0.01$. All p values were adjusted using Bonferroni correction for multiple comparisons. About 1.5% of the data was missing, which was replaced by the median in the numerical data and by the mode in the nominal data. Due to the use of non-parametric tests, extreme data remained after checking the accuracy of the data entry.

Results

General Findings on Infant and Toddler Sleep in Iran

Demographic information for caregivers and children is presented in ►Table 1 and general data on when, where, and how infants and toddlers slept are presented in ►Table 2. The median bedtime and rise time of the young children in this study were 22:30¹ and 9:00, respectively. Their median total sleep time was 11.5 hours (9.3 h night-time sleep, and 2 h daytime sleep). Most children slept in their parents' rooms (55.5%), and co-sleeping was relatively common (18.9%). Sleeping on a futon (or, as the Iranians call it, on the ground) was also common, with more than one-third of

¹ Throughout the article, in time-related values, numbers after a period (.) are fractions and numbers after a colon (:) are minutes.

Table 1 Demographic Characteristics

Child's age range (months)	Percentage
0-2	9.6
3-5	14.1
6-8	7.3
9-11	8.3
12-17	16.3
18-23	13.3
24-36	31.1
Child's sex	
Girl	47.8
Boy	52.2
Child's Birth Order	
First	66.8
Second	27.9
Third and more	5.3
Respondent	
Mother	95.5
Other	4.5
Respondent's education	
Post-graduate degree	38.7
Undergraduate degree or education	47.3
High school degree	12.5
Less than a high school degree	1.5
Respondent's employment	
Full time	17.3
Part-time	16.4
At-home, student, unemployed, etc.	66.3
Respondent's age range (years)	
< 21	1.5
21-24	6.0
25-30	24.9
31-34	27.4
35-39	31.6
> 39	8.6
Number of Bedrooms	
0	2.7
1	17.9
2	57.5
3 and more	21.9
Place of residence	
Tehran	40.9
Centers of other provinces	30.7
Other cities or villages	28.4

Table 1 (Continued)

Child's age range (months)	Percentage
Born Premature	
Yes	7.3
No	92.0
Don't know	0.7
Number of night cares (per week)	
1-3 nights	12.0
4-6 nights	7.8
7 nights	80.2

the children sleeping on blankets or mattresses on the floor, and 15.6% of them falling asleep in the arms of an adult. Most children fell asleep while being held or rocked (53.8%) and only 6.3% slept without their parent's presence. In addition, less than half of the infants and toddlers had a similar sleep routine (44.2%) or the same bedtime (38.2%) during the week. Finally, 26.1 percent of the parents reported bedtime difficulties, more than half reported sleep latency of more than 30 minutes, and 22.4 percent considered their child's sleep to be a moderate or serious problem. However, the majority of the parents reported that their infants never or rarely snore at night, their children are happy when they wake up, and they have enough confidence to manage their child's sleep. Finally, 26.2% of the infants under 36 months slept routinely on their stomachs (16.0% of 0-11 months slept prone).

Development of Sleep Measures

We investigated the development of 10 sleep measures related to children's sleep across seven age groups from birth to 36 months: (a) bedtime, (b) duration of sleep latency, (c) the number of night awakenings, (d) duration of nocturnal wakefulness, (e) rise time, (f) duration of the longest sleep episode, (g) total nighttime sleep (i.e. rise time – bedtime – sleep latency – waking after sleep onset), (h) number of naps, (i) daytime sleep (total duration of daytime naps), and (j) total sleep time. ► **Table 3** and ► **Figure 1** show the development of these 10 sleep measures from birth to 36 months and compare them across the age groups.

The total sleep time had decreased significantly throughout the first three years ($H=48.3$, $P<.0001$). The Dunn-Bonferroni test indicated that infants and toddlers over the age of 18 months slept significantly less than those under the age of 18 months. Surprisingly, no significant difference was found between the age groups under and above 18 months. The drop in daily sleep duration, on the other hand, was more dramatic ($H=198.4$, $P<.0001$). Similarly, the number of daily naps declined with age, with the median number of naps decreasing from three at 6 to 8 months to one at 12 to 17 months ($H=272.2$, $P<.0001$). Furthermore, the nighttime sleep increased with age ($H=34.5$, $P<.0001$). The infants aged 0 to 5 months slept less at night than the older ones.

The number and duration of the nocturnal awakenings and the longest sleep episode were used to assess their sleep

Table 2 Night-time sleep variables

	Median (IRQ)		
Time of starting sleep routine	22.0* (1.5)		
Bedtime (time of day)	22.5 (1.0)		
Sleep latency (h)	0.7 (0.5)		
Night wakings (n)	2.0 (2.0)		
Nocturnal wakefulness (h)	0.3 (0.3)		
Rise time (time of day)	9.0 (2.0)		
Longest sleep episode (h)	6.0 (4.5)		
Night-time sleep (h)	9.3 (1.9)		
Naps (n)	1.0 (1.0)		
Daytime sleep (h)	2.0 (1.0)		
Total sleep time (h)	11.5 (2.3)		
Sleep room (first-during)			
Own room	23.3%	27.4%	
Parents' room (including parents' bed)	55.5%	57.8%	
Other places in the house	21.2%	14.8%	
Sleep place (primary-during-waking)			
Crib	13.3%	20.3%	18.3%
Own bed	7.6%	8.3%	9.0%
Parents' bed	18.9%	18.9%	23.4%
Co-sleeper	8.3%	8.8%	8.3%
Parent's/adult's arms	15.6%	6.5%	0%
Futon	33.7%	35.2	39.1%
Other	2.6%	2.0%	1.9%
How to fall asleep			
Held or rocked	53.8%		
Only adult presence	39.9%		
On own	6.3%		
Bedtime routine (>5 nights/week)	44.2%		
Consistent bedtime (>5 nights/week)	38.2%		
Sleep latency (>30 min)	51.7%		
Difficult bedtime	26.1%		
Sleep position			
On belly	26.2%		
On side	43.0%		
On back	30.8%		
Child snore during sleep			
Never	67.1%		
Only occasionally	30.4%		
Frequently	2.5%		
Child's mood in the morning			
Happy	73.4%		
Neutral	20.8%		
Fussy	5.8%		

(Continued)

Table 2 (Continued)

	Median (IRQ)		
Perceiving child sleep as a problem	22.4%		
Confidence in managing child sleep			
Confident	67.6%		
Neutral	24.9%		
Unsure	7.5%		

*numbers after a period (.) are fractions

Table 3 Median (IQR) for Sleep measures across age groups, Kruskal-Wallis test with Dunn-Bonferroni post hoc method

	Age group (months)							H
	0-2 n = 58	3-5 n = 85	6-8 n = 44	9-11 n = 50	12-17 n = 98	18-23 n = 80	24-36 n = 187	
Bedtime (time)	23.0 (1.5)a	23.0 (2.0)a	22.0 (1.5)a	22.0 (2.0)a	22.0 (1.5)a	23.0 (1.4)a	23.0 (1.0)a	12.9
Sleep latency (h)	1.0 (0.5)a	1.0 (0.5)a	0.8 (0.5)a	0.5 (0.5)a	0.5 (0.5)a	0.5 (0.5)a	0.7 (0.5)a	6.5
Night wakings (n)	3.0 (1.0)a	2.0 (2.0)	3.0 (2.0)a	3.0 (2.0)a	3.0 (2.0)a	2.0 (2.0)b	1.0 (1.0)c	112.3**
Nocturnal wakefulness (h)	0.5 (0.8)a	0.5 (0.3)	0.5 (0.3)	0.3 (0.3)b	0.3 (0.3)b	0.3 (0.4)b	0.3 (0.4)b	34.8**
Rise time (time)	9.0 (3.0)a	9.0 (3.0)a	8.9 (2.2)	8.8 (1.5)	8.6 (2.0)	9.0 (1.5)	9.3 (1.8)b	20.2*
Longest sleep episode (h)	4.0 (3.0)a	6.0 (4.0)	4.3 (2.8)a	5.0 (3.0)a	5.0 (3.3)a	6.0 (4.0)b	8.0 (4.0)b	101.4**
Night-time sleep (h)	8.5 (2.6)a	9.0 (2.1)a	9.2 (2.3)	9.3 (1.9)	9.5 (2.0)	9.4 (1.5)	9.5 (1.9)b	34.5**
Naps (n)	3.0 (3.0)a	3.0 (3.0)a	3.0 (2.0)a	2.0 (1.0)a	1.0 (1.0)b	1.0 (0.0)c	1.0 (0.0)c	272.2**
Daytime sleep (h)	3.0 (2.0)a	3.0 (2.0)a	3.0 (2.0)a	3.0 (1.5)a	2.0 (1.00)b	2.0 (0.0)b	1.5 (1.0)c	198.4**
Total sleep time (h)	12.1 (3.2)a	11.9 (2.5)a	12.2 (2.8)a	12.2 (2.2)a	11.8 (2.0)a	11.5 (1.5)	10.9 (1.8)b	48.3**

H values are adjusted for ties. Age groups with different letters are significantly different based on the Dunn-Bonferroni post hoc method (Those with no letters are not significantly different from at least two values with different letters). The P values for post hoc comparisons are adjusted using Bonferroni correction for multiple tests.

* $P < .001$.

** $P < .0001$.

consolidation. The developmental changes in the number of nocturnal awakenings were not linear as predicted as the number of nocturnal awakenings remained as high as three per night from birth to 17 months and then declined to three years ($H = 112.3$, $P < .0001$). The length of the nocturnal awakenings also dropped from 9 to 11 months, although it remained relatively consistent from 9 months to 3 years ($H = 34.8$, $P < .0001$). The duration of the longest sleep episode increased gradually; from 3 to 5 months of age, there was only a dramatic increase in the longest sleep episodes, which subsequently fell and then progressively increased to a median of eight hours of continuous sleep ($H = 101.4$, $P < .0001$). Except for bedtime and sleep latency, all measures indicated a significant difference across age groups.

The number and duration of nocturnal awakenings and the duration of the longest sleep episode were used to assess their sleep consolidation. The developmental changes in the number of nocturnal awakenings were not linear as the

number of nocturnal awakenings remained as high as three per night from birth to 17 months, and from then until 3 years old, it decreased continuously ($H = 112.3$, $P < .0001$). The duration of the night wakefulness decreased slightly in the 9 to 11 months group and remained constant until 3 years of age ($H = 34.8$, $P < .0001$). On the other hand, the longest sleep episode from birth to 5 months of age went up from 4 to 6 hours, then decreased to 4.3 hours, and then steadily climbed to a median of 8 hours of continuous sleep ($H = 101.4$, $P < .0001$). Except for bedtime and sleep latency, all other measures revealed a statistically significant difference among the age groups.

Sleep Settings and Parental Behaviors

–**Table 4** shows the frequency of sleep-related behaviors among parents of various ages. Age-related changes were evident in bedtime routines, how the child-initiated sleep, and how the parents reacted to the child's night awakenings.

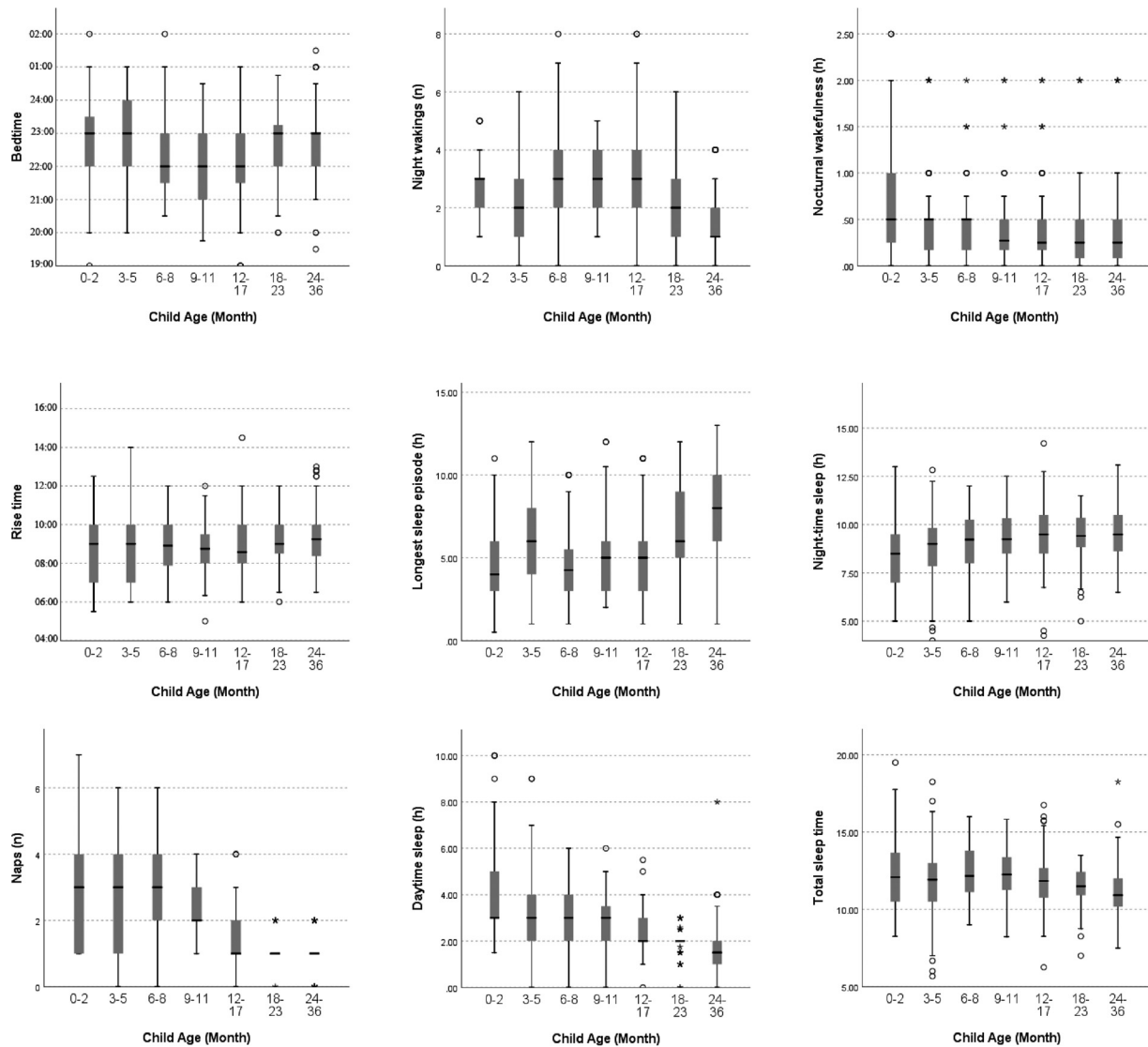


Fig. 1 Measures for infants' and toddlers' sleep. Boxplot for 9 measures for infants' and toddlers' sleep in Iran.

As the children grew older, the percentage of those who routinely watched TV or ate snacks at night increased. In addition, as expected, a higher proportion of the parents of the older children brushed their children's teeth or read books as part of their children's bedtime routine. There was no difference in the other bedtime routines among different age groups of infants and toddlers.

Infants and toddlers initiated sleeping in a variety of ways, depending on their age. As the child grew older, the percentage of parents who reported bottle-feeding or breastfeeding to put their children to sleep decreased dramatically. Also, from birth to 8 months, the use of pacifiers to put infants and toddlers into sleep increased, and from then on, gradually decreased. Except for the over-24-month age group, the majority of the parents held and/or rocked their child to sleep, while independent sleep was less common across all the age groups. Holding or rocking, on the other hand, decreased with age, and as the child grew older, a greater percentage of parents simply stayed in their child's room until he or she fell asleep. The

proportion of parents who left their children alone to sleep did not change.

Most strategies for resuming a child to sleep after night awakenings did not differ across the age groups. For example, while most parents put younger infants to sleep by holding and rocking them, there was no age-based difference in this method for nocturnal awakenings. However, the use of rubbing or patting increased with age. Caregivers of the younger infants were also more likely to use bottle-feeding or breastfeeding to soothe their child (67.2% for newborns vs 7.5% for toddlers). Furthermore, diaper changes during night awakenings decreased with age (from 27.6% in newborns to 3.2% in toddlers). Waiting for a few minutes to see if the child would fall asleep was another common strategy that did not show a significant change during the first three years of life. The parents rarely used the cry-it-out method to resume their children to sleep (0 to 1.7%). In addition, the caregivers seldom used games and TV to put their children to sleep (0 to 2.1%). Other strategies such as verbal comfort, bringing the child to the

Table 4 Sleep measures across age groups

	Age group (months)							X ²
	0-2	3-5	6-8	9-11	12-17	18-23	24-36	
bedtime routines								
Bathing	5.2a	7.1a	6.8a	8.0a	11.2a	6.3a	5.9a	3.4
Playing	25.9a	28.2a	22.7a	32.0a	32.7a	21.3a	31.6a	0.6
Electronic devices	6.9a	21.2a	6.8a	10.0a	9.2a	12.5a	23.5a	21.9
Watching TV	12.1a	18.8b	15.9b	24.0b	25.5b	21.3b	36.9c	23.3*
Listening to music	20.7a	21.2a	20.5a	28.0a	22.4a	18.8a	13.4a	7.6a
Eating snack	12.1a	11.8a	15.9a	32.0b	36.7b	32.5b	32.6b	28.8**
Brushing teeth	8.6a	5.3a	4.5a	10.0a	16.3a	32.5b	41.2b	62.3**
Massage	25.9a	15.3a	25.0a	18.0a	12.2a	12.5a	12.3a	10.9
Reading	1.7a	12.9b	9.1b	10.0b	16.3b	22.5b	36.9c	54.3**
Sleep initiation methods								
Sing to the child	8.6a	17.6a	25.0a	16.0a	15.3a	18.8a	9.6a	11.1
Nursing/ bottle feeding	81.0a	64.7b	72.7b	68.0b	69.4b	47.5c	25.1d	104.3**
Give child pacifier	22.4b	16.5b	38.6a	20.0b	26.5b	17.5b	11.8c	21.7*
Holding or rocking	69.0b	67.1b	79.5a	72.0b	62.2b	51.2c	28.9d	79.5*
Only adult presence	25.9a	27.1a	15.9a	22.0a	36.7a	41.3a	61.5b	64.7*
On own	5.1a	5.8a	4.6a	6.0a	1.1a	7.5a	9.6a	8.7
Resuming sleep methods								
Holding or rocking	32.8a	28.2a	29.5a	22.0a	17.3a	25.0a	19.8a	8.4
Rubbing or patting	17.2b	27.1c	34.1d	8.0a	19.4b	28.8c	39.0d	29.2**
Lying on side	6.9a	9.4a	6.8a	10.0a	13.3a	10.0a	20.3a	14.2
Giving a bottle	20.7a	18.8a	29.5a	26.0a	17.3a	21.2a	17.1a	5.2
Nurse back to sleep	67.2a	50.6a	52.3a	62.0a	56.1a	32.5b	7.5c	130.9**
Give child pacifier	12.1	12.9	27.3	14.0	17.3	11.2	7.0	16.2
Changing diapers	27.6a	18.8b	9.1b	12.0b	4.1c	5.0c	3.2c	45.7**
Verbal comfort	8.6a	10.6a	11.4a	2.0a	6.1a	8.8a	18.2a	17.0
Bring to parents' bed	8.6a	3.5a	4.5a	8.0a	5.1a	8.8a	8.0a	3.6
Let cry to fall asleep	1.7a	1.2a	0.0a	0.0a	2.0a	1.2a	1.1a	1.9
Wait a few minutes	31.0a	25.9a	22.7a	16.0a	27.6a	21.2a	25.1a	4.4
Play or watch TV	1.7a	0.0a	0.0a	0.0a	1.0a	1.2a	2.1a	3.8
Sing to the child	19.0a	14.1a	18.2a	10.0a	14.3a	13.8a	12.3a	3.0

The groups with the same letters do not differ significantly. (z-tests – $\alpha = 0.05$).

*Adjusted Ps < .001. (Adjusted P values using the Bonferroni method)

**Adjusted Ps < .0001.

parent's bed, lying next to the child, singing, and using a pacifier showed no age-based differences.

Room-sharing and Bed-sharing

Only 23.3 percent of the children slept in their bedrooms. In contrast, 55.5 percent of them slept in their parent's room (18.9% in their parents' bed). Surprisingly, 21.2 percent of the parents reported that their children initiated sleeping somewhere other than their or their parent's bedroom, and 14.8 percent of them slept there for the whole night. According to the authors' personal experience, the majority of these

children most likely slept in the living room. As shown in ► **Figure 2**, the likelihood of a child sleeping in a separate bedroom increased with age, while the percentage of children sleeping in the parents' room (outside the bed) decreased. Finally, the percentage of children sleeping in their parents' beds or elsewhere in the house did not change with age and remained nearly constant (approximately 20% each).

Perception of Child's Sleep as a Problem

More than a quarter of the parents reported that their child's bedtime was difficult (26.1%). A similar proportion of them

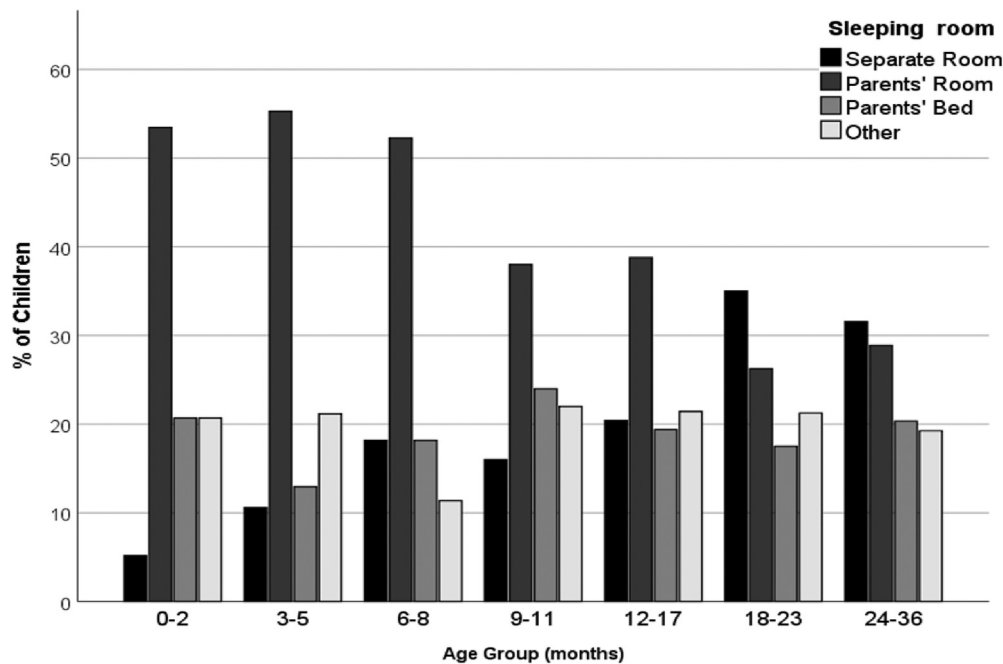


Fig. 2 Child sleeping room in different age groups. Child sleeping room in different age groups. Here the term “parents’ room” refers to all areas of the parents’ bedroom other than their bed.

(22.4%) thought their child’s sleep was a moderate (15.8%) or serious (6.6%) problem. Caregivers of children aged 6 to 8 months perceived their child’s sleep to be the least problem (15.9%), while caregivers of children aged 12 to 17 months considered it to be most problematic (30.6%). However, the difference among the seven age groups was not statistically significant ($X^2 = 5.5$, $P = 0.479$). Furthermore, only 2.5% of the parents reported that their children snore frequently. Finally, a relatively high proportion of them (73.4%) rated their child’s morning mood as happy, and the majority (67.6%) stated that they had sufficient self-confidence in their child’s sleep management.

Family and Social Support in Child Care

Mothers bore the majority of the responsibility for childcare as in most cases (74.0%), the mother always or usually put the children to bed, and when they cried at night, the mothers (83.2%) usually responded to them. Occasionally (21.9% at bedtime and 15.3% during the night), both parents shared equally in night care, and only rarely (4.1% at bedtime and 1.5% during the night) did someone other than the parents care for the child at night. However, more than half of the mothers (51.5%) felt they received a lot of help from their spouses when it came to childcare. Furthermore, the majority of the respondents (83.3%) reported receiving assistance from their extended family or other relatives. In contrast, they rarely (3.2%) used daycare or babysitter services. The maternal grandparents (64.1%) were the most supportive of parents in childcare, followed by the paternal grandparents (25.1%), other relatives of the mother (11.5%), other relatives of the father (3.7%), and family friends (1.2%). Finally, some parents (13.0%) reported receiving no social or family support in childcare.

Discussion

This study, as far as we know, is the first relatively extensive survey on sleep patterns of infants and toddlers (0 to 36 months) in Iran and can provide important reference data for therapists and future researchers. There was insufficient literature on the sleep of infants and toddlers in Iran to compare our findings. In the only previous study that measured sleep patterns in 11- to 27-month-old infants in Iran,¹⁶ the infants slept later (about 22:25 vs. 23:25) and woke up later (about 9:01 vs. 9:29) than their peers in the current study.

Many of the study’s findings can be highlighted. First, there were age-related changes in the sleep of infants and toddlers; nighttime sleep increased, daytime sleep decreased, and children’s sleep became more consolidated with age, with the longest sleep episode doubling over the first three years of life. However, these changes were not as pronounced and linear as the findings of previous research in other countries.²⁰

Many families did not appear to have a regular schedule for their children’s sleep, with 44.2% having a similar sleep routine, 32.2% having the same bedtime during the week, and 21.2% sleeping outside their or their parent’s room (probably in the living room). The parents were also less likely to encourage their children’s independent sleep and self-soothing. Most of the children under the age of two, for example, fell asleep while being held and rocked. In addition, a significant proportion of the parents reported some inappropriate sleep habits, such as watching TV (12.1% to 36.9%). It is worth mentioning that 16.0% of the infants under the age of 11 months slept in a prone posture, even though prone

sleeping is the most modifiable risk factor for sudden infant death syndrome (SIDS; ²¹). As a result, offering parental education through the media and implementing initiatives such as the Back to Sleep to promote supine sleeping in Iran can help reduce SIDS incidences.

These findings might be significant since having a consistent sleep schedule from a young age is a critical component of obtaining enough sleep. Sleeping issues and insufficient sleep duration can be caused by an inconsistent sleep pattern and bad sleep habits such as watching TV before bed.²² An extensive study²³ found that an irregular sleep routine was linked to longer sleep onset latency, increased night wakings, and decreased sleep duration, which is also evident in this study. We were unable to discover any studies that explained why mothers in Iran do not encourage a sleep routine in their infants and toddlers. However, this might be due to mothers' lack of understanding about the necessity of regular infant sleep. Also, cultural factors that encourage mothers to sleep next to and soothe their infants, the custom of nightly family meetings, and economic worries may all contribute to infants' irregular sleep schedules. However, further study is required in this area.

Compared to the reported means and ranges in systematic reviews²⁴ and consensus sleep duration recommendations,^{25,26} the sleep duration of infants in Iran, especially those aged 0-2 and 3-5 months, was in the low range or at an unhealthy level. Also, in comparison to the data from Mindell and her colleagues'¹¹ study on East Asian sleep habits, infants and toddlers in Iran had less total sleep (11.5 h vs 12.3 h), later bedtime (22:30 h vs 21.44 h), and more night awakenings (2 vs 1.69 times) and took longer to sleep (51.7% took longer than 30 min vs. 19.3%). They were, on the other hand, less likely to co-sleep with their parents (18.9% vs. 64.7%). When we compare Iranian children to children from mostly Caucasian countries,¹¹ we see a similar tendency (less sleep, later bedtime, more night awakenings, and more sleep latency), but even with larger disparities.

Interestingly, despite quantitative measures indicating poor sleep quality and quantity among Iranian infants and toddlers, the Iranian parents were less likely to believe their child had a sleep problem compared to Mindell et al.'s¹¹ East Asian parents (22.4% vs. 51.9%) and nearly as much as parents in predominantly Caucasian countries (26.3%). These findings can be interpreted in light of parental expectations and cultural differences in attributions. Cultural differences in the beliefs, values, expectations, and caring roles of family members, for example, can play a role in perceiving a child's sleep as a problem.

Three major limitations of this research need to be mentioned. First, this study relied on parental reports rather than objective sleep measures like actigraphy. Second, the sample size in this study was insufficient to obtain reference data. Third, because the survey was web-based, it was likely that the participants were more educated or had a higher socioeconomic status than the general population. In addition, the data have been collected through parenting pages on social media, which may have attracted a specific group of participants. However, studies have shown that child sleep

data collected via the Internet is very similar to those obtained via traditional methods.¹⁹

Overall, the current study discovered that infants and toddlers in Iran have relatively short sleep duration, and parents do not consistently encourage a regular sleep routine or independent sleep. The results need to be researched further to determine the causes and consequences. There is evidence that infant height and weight are lower in parts of Iran than the global average.²⁷ Therefore, it can be argued that one of the causes of this delay in physical growth is insufficient sleep at an early age. Further research can examine this hypothesis more closely. More research is also required to better understand the specific causes of infants' and toddlers' short and irregular sleep in Iran to develop culturally appropriate programs for teaching parents the recommended sleep training methods.

Conflict of Interest

None declared.

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