Sleep problems in 0-36 months old Indonesian children with atopic dermatitis

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Abstract

Atopic dermatitis (AD) is a chronic, relapsing, highly pruritic skin condition that develops in early childhood. Sleep problems are common in AD children and lead to impaired quality of life, disturbance of neurocognitive function and behavior. The aim of this study was to assess the prevalence of sleep problems in 0-36 months old Indonesian children with AD. Children aged 0-36 months were enrolled, divided into two groups, AD and control. Sleep problems and AD were assessed using Brief Infant Sleep Questionnaire (BISQ) and Severity Scoring of Atopic Dermatitis Index (SCORAD). Chi-square test was performed to compare the outcome. There were 35 children participating in each group. In children with sleep problems, 85.7% were diagnosed with AD and 11.4% were non-AD. Nocturnal sleep duration, night waking, nocturnal wakefulness, sleep onset time, method of falling asleep and parental consideration of sleep problems occur more often within AD group. Severity of AD also significantly contributes to sleep problems in AD group. In conclusion, this study showed that sleep problems are more prevalent in children with AD.

Introduction

Atopic dermatitis (AD) is a common chronically relapsing pruritic inflammatory skin disease. AD is a complex disease with a genetic predisposition strongly influenced by innate and adaptive immune responses.[1-3] Sleep problems in children with AD is a serious issue because sleep plays an important role in promoting physical and mental health. Sleeping patterns mostly develop in the first year of an infant's lifespan. It is suggested that about 20-30% of children may have sleeping problems in their first 3 years of life and it maybe relate to the behavioral pattern at noon and familial/parental problem. Many sleep problems are associated with problems of cognitive functioning, learning, attention and school performance.[4-7] The prevalence of sleep problems in children with AD is approximately range from 47% to 60% and appear especially during infancy to preschool age.[8,9] Despite the widespread prevalence of sleep disruption in children with AD, the mechanism of this disruption is poorly understood.[8-10]

It is recommended that clinician should ask general questions about itch, sleep, impact on daily activity, and persistence of disease using disease severity during practical. A variety of measurement tools are utilized in sleep assessment, including Electroencephalography (EEG), Polysomnography, Actigraphy and Brief Infant Sleep Questionnaire (BISQ). The BISQ is used to screen sleep problems. The Severity Scoring of Atopic Dermatitis Index (SCORAD) is commonly used to determine the severity of AD, can also be used to determine subjective patient assessment of itch and sleep loss.[11,12] This study investigates the prevalence of sleep problems in children with AD in Indonesia.

Materials and Methods

Methods

A cross sectional study was conducted in Surabaya and Sidoarjo, Indonesia on September 1st to October 31st 2017. The sample of this study was 70 children who consisted of 35 children with AD and 35 children with no AD. Sample size was calculated based on the total sampling. Children enrolled in the study met the following criteria: age between 0 and 36 months old who had AD for 3 months before the study began and did not have AD, stable medical conditions, and no change in medication related to sleep or health status in the past 3 months. Diagnosis of AD based on history and physical examination.[11] Researcher interviewed the parents/caregivers and completed a BISQ after the parents were being informed of the study and gave their written consents. Weight measurement was taken for all the children and plotted in the WHO growth chart to determine the nutritional status (weight for age). Data then were presented as a distribution and percentage of each variable referring to the BISQ and nutritional status. Analysis of AD relationship to sleep problems used chi-square, with significant test with 95% confidence interval and SPSS 17.0 performed it. This study was approved by the Ethics Committee of Soetomo Hospital/Faculty of Medicine, Airlangga University, Surabaya, Indonesia.

Materials

The Brief Infant Sleep Questionnaire (BISQ) was used to assess the sleep problems. These questionnaires were attained primarily by retrospective method with the parents/caregivers recalling on sleep patterns, disturbances, or behaviors (e.g., sleeping arrangement, preferred body position during sleep, nocturnal sleep duration, daytime sleep duration, number of night waking, duration of wakefulness during the night hours (10 pm-6 am), settling time, method of falling asleep, nocturnal sleep-

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onset duration, parenteral consideration of sleep problem). Sleep problems were defined as the presence of one or more of the following conditions, such as less than 9 hours of nocturnal sleep duration, more than 3 times of night waking, and more than 1 hour of duration of wakefulness.[13] Degree of severity of AD is based on SCORAD index.[14] Anthropometry assessment is based on WHO Growth chart.[15]

Results

There were seventy 0-36 months old children who participated in this study and divided into 2 groups, 35 children with AD and 35 children without AD.

I. Distribution (Table 1)

II. Brief Infant Sleep Questionnaire (BISQ)

Sleep measurements in both groups showed significant results in nocturnal sleep duration, night waking, nocturnal wakefulness, sleep onset time, method of falling asleep and parental consideration of sleep problems (Table 2).

Based on BISQ, the prevalence of sleep problems for children with AD was 85.7% and 11.4% children without AD respectively (Table 3).

Discussion

This study has found that among children with sleep problems, 85.7% was reported suffering AD and only 11.4% children were without AD. The prevalence of children with AD in our study (85.7%) was higher than other studies that found sleep problems in children with AD, with rates ranging from 47% to 60% and appear especially during infancy to pre-school age.[8,9] Diagnosis of sleep problems in this study based on nocturnal sleep duration less than 9 hours, children waking up at night more than 3 times, and nocturnal wakefulness for more than one hour. In our study, cause of sleep problems was pruritus and scratching. It is also worth noting that sleep near parents was a factor for sleep problems according to BISQ, in which usually practiced by Indonesian parents.[16,17]

There were significant differences for nocturnal sleep duration, night waking, nocturnal wakefulness, sleep onset time, method of falling asleep and parental consideration of sleep problems in children with AD compared to children without AD based on *Brief Infant Sleep Questionnaire*

Table 1. Characteristic of children with/out AD (N=70).

Participants	Children with AD (N=35)	Children without AD (N=35)
Age (months) Mean ± SD (range)	17±10	19±10
Gender		
Boy	16	16
Girl	19	19
Anthropometry (Weight for Age)		
Severely underweight	0	0
Underweight	4	8
Median	31	27
Overweight	0	0
Obesity	0	
Family history of Atopy		
Yes	23	17
No	12	18
Birth order of the child		
Oldest	15	14
Middle	4	3
Youngest	16	10
SCORAD Index		
Mild	25	0
Moderate	10	0
Severe	0	0

Table 2. Brief Infant Sleep Questionnaire (BISQ) in children 0-36 months old.

	Group AD (+) N (%)	P AD (-) N (%)	
Nocturnal sleep duration			
< 9 hours	30 (85.7)	4 (11.4)	*
≥ 9 hours	5 (14.3)	31 (88.6)	
Daytime sleep duration			
< 9 hours	28 (80)	33 (94.3)	NS
≥ 9 hours	7 (20)	2 (5.7)	
Night waking			
≥ 3 times	25 (71.4)	2 (5.7)	*
< 3 times	10 (28.6)	33 (94.3)	
Nocturnal wakefulness			
≥1 hour	9 (25.7)	0	*
< 1 hour	26 (74.3)	35 (100)	
Sleep onset time			
< 30 minutes	17 (48.6)	31 (88.6)	*
≥ 30 minutes	18 (51.4)	4 (11.4)	
Method of falling asleep			
Feeding	2 (5.7)	13 (37.1)	*
In bed alone	4 (11.4)	9 (25.7)	
Being rocked	1 (2.9)	0 (0)	
In bed near parent	10 (28.6)	9 (25.7)	
Being held	18 (51.4)	4 (11.4)	
Settling time			
≥ 8 pm	7 (20)	10 (28.6)	NS
< 8 pm	28 (80)	25 (71.4)	
Parental consideration of sleep problem			
Serious problem	10 (28.6)	0 (0)	*
Small problem	9 (25.7)	7 (20)	
No problem	16 (45.7)	28 (80)	

*P<0.05 (Chi-Square test); NS: Non significant.

Table 3. Children with AD who had sleep problems

Sleep Problems	Children with AD	Children without AD	P
Yes	30 (85.7)	4 (11.4)	0.001*
No	5 (14.3)	31 (88.6)	0.001*

*Significant (Chi-Square test).

(BISQ). Our study also found that majority of daytime and nocturnal sleep duration in children with AD is less than 9 hours, which is similar with study by Dogan (2017) that found children with AD did not have decrease daily total sleep duration.[8] However, several studies found that sleep duration was significantly reduced in infants with severe AD.[8,9,18] Pathophysiology of sleep problems in children with AD is still not fully understood. Circadian rhythm of cytokines, immune system, melatonin, and skin physiology such as transcutaneous water loss and skin blood flow might play a role.[9] The sleeping problems which mostly happens in children were reported had relation with the frequency of waking up at night and their sleep onset time.[18] However, this study has found that children with AD have generally longer afternoon naptime compared with non-AD children, although with a higher frequency of waking up during naptime. We also found that severity of AD in this study is based on SCORAD Index showed association to sleep problems in AD group. This suggests that severity of AD may reflect the severity of sleep problems itself.

Adequate sleeping is important in maintaining children's health and development. However, sleeping problems may affect negatively towards the quality of life of the patients, their cognitive function, behavioral patterns, and shifting of moods. It is suggested that AD may have an association with *attention deficit hyperactivity disorder*, behavioral problems and conduction and short-term self-control only if it is related with sleeping problems.

Finally, we conclude that there was higher prevalence of sleep problems within children with AD compared to normal children. Without good sleep quality, children with AD may have poorer quality of life compared to normal children. Therefore, a thorough examination, proper diagnosis, adequate AD control, and comprehensive AD complication management need to be provided to ensure good quality of life in children with AD.

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