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The Relationship Between Parents' Sleep Quality and Chronotype and Children's Sleep Habits

Ebeveynlerin Uyku Kalitesi ve Kronotipi ile Çocukların Uyku Alışkanlıkları Arasındaki İlişki

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Abstract

Objective: Sleep is crucial for children's development, affecting their physical, behavioral, emotional, and cognitive performance. Parents' sleep problems can affect their children's sleep patterns and vice versa. The current study aims to assess parental sleep quality and chronotype and their relationship to their children's sleep habits.

Materials and Methods: This study included 122 healthy children between the ages of 4 and 12. Parents' sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI), chronotype was assessed with the Morningness-Eveningness Questionnaire, and children's sleep habits were measured using the Children's Sleep Habits Questionnaire (CSHQ).

Results: Based on the CSHQ (cut-off score >41), 88.5% of the children were found to have sleep disturbances. According to the PSQI, 33% of the mothers and 41.2% of the fathers were identified as having poor sleep quality. Most mothers and fathers were classified as intermediate chronotypes, followed by morning chronotypes, with evening chronotypes being the least common. Parental PSQI scores were positively correlated with children's overall CSHQ scores (r=0.192, p=0.048), as well as specific CSHQ subscales: bedtime resistance (r=0.251, p=0.010), sleep onset delay (r=0.306, p=0.001), sleep duration (r=0.213, p=0.028), sleep anxiety (r=0.195, p=0.045), and night waking (r=0.210, p=0.031).

Conclusion: These findings suggest that children are at a high risk of having sleep disturbances and that there is a link between parental sleep quality and children's sleep habits. Further research is required to enhance the understanding of the relationship between the sleep health of parents and their children.

Keywords: Children, chronotype, sleep quality, parent, sleep habit

Öz

Amaç: Uyku, çocukların gelişimi açısından kritik öneme sahiptir ve fiziksel, davranışsal, duygusal ve bilişsel performanslarını etkileyebilir. Ebeveynlerdeki uyku sorunları çocuklarının uykusunu etkileyebilir ve bunun tersi de geçerlidir. Bu çalışmanın amacı, ebeveynlerin uyku kalitesi ve kronotiplerini değerlendirmek ve bunların çocuklarının uyku alışkanlıklarıyla olan ilişkilerini incelemektir.

Gereç ve Yöntem: Çalışmaya, 4-12 yaş aralığında 122 sağlıklı çocuk dahil edilmiştir. Ebeveynlerin uyku kalitesi Pittsburgh Uyku Kalitesi İndeksi (PSQI) ile, kronotipleri ise Sabahçılık-Akşamcılık Anketi ile değerlendirilmiştir. Çocukların uyku durumu Çocuk Uyku Alışkanlıkları Anketi (CSHQ) kullanılarak incelenmiştir.

Bulgular: CSHQ'ya göre (kesme puanı >41), çocukların %88,5'inde uyku bozukluğu olduğu tespit edilmiştir. PSQI'ye göre, annelerin %33'ü ve babaların %41,2'si kötü uyku kalitesine sahip olarak tanımlanmıştır. Kronotip açısından bakıldığında, ebeveynlerin çoğunun orta kronotipte yer aldığı, bunu sabahçıl kronotipin izlediği ve akşamcıl kronotipin ise en az yaygın grup olduğu gözlenmiştir. Ebeveynlerin PSQI puanları, çocukların genel CSHQ puanları (r=0,192, p=0,048) ve spesifik CSHQ alt ölçekleri ile pozitif korelasyon göstermiştir: Yatma zamanı direnci (r=0,251, p=0,010), uyku başlangıcı gecikmesi (r=0,306, p=0,001), uyku süresi (r=0,213, p=0,028), uyku kaygısı (r=0,195, p=0,045) ve gece uyanması (r=0,210, p=0,031).

Sonuç: Bu bulgular, çocukların uyku bozuklukları açısından yüksek risk altında olduğunu ve ebeveynlerin uyku kalitesinin çocukların uyku alışkanlıklarıyla ilişkili olduğunu göstermektedir. Ebeveyn ve çocuk uyku sağlığı arasındaki ilişkinin daha iyi anlaşılması için daha fazla araştırma yapılması gerekmektedir.

Anahtar Kelimeler: Çocuk, kronotip, uyku kalitesi, ebeveyn, uyku alışkanlığı

Introduction

Sleep is vital for human health and well-being,[1-4] influencing physical and mental health, performance, growth, energy conservation, brain function, neural maturation, learning, and memory.[5] Its role is especially critical during childhood, affecting development, behavior, and cognitive function. Despite its importance, having insufficient sleep has become a widespread health issue in modern societies.[4,6] Recent meta-analyses have shown that the global prevalence of sleep disturbances has

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reached alarming levels in children and adolescents at 54% and 34% respectively.[7,8]

Chronotype refers to individual differences in sleep-wake patterns and biological rhythms across the lifespan. It influences psychological, cognitive, and physiological processes, including mood, endocrine function, cognition, and body temperature.[9] Chronotypes are typically classified into three groups: morning, evening, and intermediate types.[10] A stable circadian rhythm is essential for maintaining human well-being.[11,12]

Parents and children influence each other's sleep through shared environmental factors such as culture, living conditions, and socio-economic status, as well as any genetic predispositions affecting sleep patterns. Consequently, sleep problems in parents can affect their children's sleep, and vice versa.[13] Moreover, unhealthy sleep habits established in childhood may contribute to the development of persistent poor sleep patterns later in life.

Insufficient sleep and daytime sleepiness in children can significantly impact their overall health, academic performance, and social relationships.[14] Therefore, promoting healthy sleep habits from an early age is essential.[15] Pediatric healthcare providers should include sleep health assessments in routine well-child visits, emphasizing that a healthy sleep routine is as important as nutrition, physical activity, and dental hygiene.[5]

Studies show that children's sleep is linked to their parents' sleep patterns.[5,16-18] To our knowledge, no research has been conducted in Türkiye that compares parents' sleep and chronotype with children's sleep habits. The present study aims to address this gap by investigating the relationship between children's sleep habits and their parents' sleep quality and chronotype.

Materials and Methods

Participants

This study was conducted with a non-probability sampling method among the parents of healthy children between the ages of 4 and 12 who visited the General Pediatrics Outpatient Clinic of Koç University Hospital between November 2023 and June 2024. Ethical approval for this research was secured from the Institutional Review Board of Koç University (approval number: 2023.375.IRB3.168, date: 02.11.2023). The research was performed in adherence to the principles of the Declaration of Helsinki. Participants were required to be healthy children between the ages of 4 and 12, with no prior history of chronic illness, sleep disorders, psychiatric conditions, or regular medication use. Parents were asked to complete three questionnaires that covered socio-demographic information, sleep quality, chronotype, and children's sleep habits. The questionnaires were distributed via an online link (Qualtrics). Before starting the survey, participants were provided with a brief summary of the research, and electronic informed consent was obtained.

Inventories

The socio-demographic form was used to collect data on children's age, weight, height, outdoor activity time, and screen time, in addition to parents' age and education levels and use of electronic devices. Parents were asked to fill out the following inventories: the Pittsburgh Sleep Quality Index (PSQI) and the Morningness-Eveningness Questionnaire (MEQ). Mothers were asked to complete the Children's Sleep Habit Questionnaire (CSHQ).

The Child Sleep Habit Questionnaire

The CSHQ, designed by Owens et al.,[20] consists of 33 items designed to examine children's sleep quality and patterns.[19] Fiş et al.[20] conducted a study on validity and reliability for Turkish children. The questionnaire targets children aged 4 to 12 years and is organized into eight subscales, including categories such as bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep-disordered breathing, and daytime sleepiness. The CSHQ is completed retrospectively by parents to examine the children's sleep habits during the previous week. Each item is assessed using a 3-point scale. A score above 41 indicates the likelihood of a pediatric sleep disorder, with higher scores indicating more significant sleep disturbances.[19] The Cronbach's alpha coefficient for this study was 0.728.

Pittsburgh Sleep Quality Index

The PSQI, originally designed by Buysse et al.[21] in 1989, was translated and modified for Turkish use by Agargun et al.[22] The PSQI is a self-administered scale composed of 19 items designed to examine sleep quality and disturbances experienced during the previous month. It comprises 24 items, with 19 being self-report items and 5 requiring responses from a partner or roommate. The 18 scored items on the scale are grouped into seven components. Each item is assigned a rating between 0 and 3. The cumulative score, obtained by summing the values of all seven components, falls between 0 and 21, with a score greater than 5 signifying 'poor sleep quality'.[22] The Cronbach's alpha coefficient of the study was 0.701.

The Morningness-Eveningness Questionnaire

The MEQ was designed by Horne and Ostberg.[23] A Turkish reliability study was performed by Pündük et al.[24] in 2005. The self-report scale consists of 19 questions that explore an individual's lifestyle, sleep/wake patterns, and overall performance. The total score from the questionnaire is used to determine an individual's chronotype. Scores ranging from 16 to 41 signify an "evening" chronotype, scores from 42 to 58 represent an "intermediate" chronotype, and scores from 59 to 86 indicate a "morning" chronotype. The Cronbach's alpha coefficient of the study was 0.802.

Statistical Analaysis

Analyses were conducted using IBM SPSS Statistics Version 28.0. The normality of the variables was assessed through histogram plots and the Shapiro-Wilk test. To assess relationships between independent categorical variables, the Pearson chi-square or chi-square test was used. The Mann-Whitney U test was utilized to compare two groups of continuous independent variables that did not adhere to a normal distribution. Spearman's correlation was used to analyze associations between non-normally distributed continuous variables.

Results

Socio-demographic Characteristics

The participants were 122 children aged 4 to 12 years from İstanbul, Türkiye. The study included all the children's mothers (100%, n=122) and the majority of the fathers (62.3%, n=76). The median age of the children was 6.0 years, and the gender distribution was nearly equal, with 63 females (51.6%) and 59 males (48.4%). The socio-demographic data of the participants are presented in Table 1.

Parents' Sleep and Chronotype Characteristics

The mean bedtime was 23:37 for mothers and 23:35 for fathers (p=0.080). The mean wake time was 7:18 for mothers and 7:18 for fathers (p=0.664), with mean total sleep time of 7.0 hours for mothers and 6.8 hours for fathers (p=0.177). PSQI scores were 4.0 for mothers and 5.0 for fathers (p=0.486). MEQ scores were also similar, with mothers scoring 53.0 and fathers scoring 52.5 (p=0.626). Regarding sleep quality, 67% of mothers reported good sleep compared to 58.8% of fathers (p=0.275). The sleep measurements of the parents are presented in Table 2.

Children Sleep Characteristics

The mean bedtime was 21:31, with a mean wake time of 7:37. The mean total sleep time was 9.3 hours. The median score on the CSHQ was 49.0, and 88.5% of the children (n=108) had a cutoff score greater than 41, indicating the presence of a sleep disturbance. Sleep characteristics of the children are presented in Table 3.

Associations Between Children and Parents' Sleep Characteristics

Correlation Analysis

The correlation analysis between parental sleep and chronotype variables and children's sleep habits is presented in Table 4. A weak positive correlation was found between parental PSQI scores and several children's sleep-related variables, including: CSHQ scores (r=0.192, p=0.048), bedtime resistance (r=0.251, p=0.010), sleep onset delay (r=0.306, p=0.001), sleep duration (r=0.213, p=0.028), sleep anxiety (r=0.195, p=0.045), and night waking (r=0.210, p=0.031). Furthermore, a weak negative correlation was observed between PSQI scores and child daytime sleepiness (r=-0.202, p=0.038) (Table 4).

There was also a moderate negative correlation between parental MEQ scores and parental PSQI scores (r=-0.359, p<0.001) and a weak negative correlation between parental MEQ scores and child sleep anxiety (r=-0.210, p=0.020) (Table 4).

No significant correlations were found between CSHQ scores and child age (r=-0.170, p=0.062), child screen time (r=-0.109, p=0.255), or child outdoor activity (r=-0.124, p=0.198).

Table 1. Socio-demographic characteristics of the participants

Children age, years, median (IQR)	6.0 (3.0)
Gender, n (%) Female Male	 63 (51.6) 59 (48.4)
BMI, (kg/m^2), median (IQR)	16.0 (3.4)
Maternal age, years, median (IQR)	37.0 (8.0)
Paternal age, years, median (IQR)	40.0 (8.0)
Maternal education level, years, median (IQR)	16.0 (3.0)
Paternal education level, years, median (IQR)	16.0 (1.0)
Marriage duration, median (IQR)	10.0 (5.0)
Marriage status, n (%) Marriage Divorced	 114 (93.4) 8 (6.6)
Number of children, n (%) 1 child 2 children ≥3 children	 67 (54.9) 47 (38.5) 8 (6.6)
Which child, n (%) 1st child ≥2nd child	 106 (86.9) 16 (13.1)
Maternal screen time, hours, median (IQR)	3.0 (5.0)
Paternal screen time, hours, median (IQR)	4.0 (4.0)
Children's screen time, hours, median (IQR)	2.0 (1.0)
Children's outside activity time, hours, median (IQR)	1.0 (1.0)

IQR: Interquartile range, BMI: Body mass index

Table 2. Sleep measurements of parents

	Maternal (n=122)	Paternal (n=76)	p
Bedtime, mean (SD)	23:37 (01:01)	23:35 (02:41)	0.080*
Wake time, mean (SD)	7:18 (01:12)	7:18 (00:51)	0.664*
Total sleep time, mean (SD)	7.0 (1.3)	6.8 (1.2)	0.177*
Sleep latency, mean (SD)	14.1 (12.4)	16.3 (13.4)	0.310*
Sleep efficiency, mean (SD)	89.6 (13.1)	91.2 (9.3)	0.684*
PSQI score, median (min.-max.)	4.0 (1-14)	5.0 (0-13)	0.486*
MEQ score, median (min.-max.)	53.0 (31.0-75.0)	52.5 (33.0-75.0)	0.626*
Good sleep quality, n (%)	71 (67)	40 (58.8)	0.275**
Bad sleep quality, n (%)	35 (33)	28 (41.2)	
Morning chronotype, n (%)	31 (25.4)	22 (28.9)	0.110**
Intermediate chronotype, n (%)	82 (67.2)	42 (55.3)	
Evening chronotype, n (%)	9 (7.4)	12 (15.8)	

*Mann Whitney U test, **Chi-square tests.

SD: Standard deviation, PSQI: Pittsburgh Sleep Quality Index, MEQ: Morningness-Eveningness Questionnaire, min.: Minimum, max.: Maximum

Discussion

The aim of the present study is to evaluate the sleep quality and chronotype of parents and to examine their relationship with the sleep habits of their children. A total of 122 children between the ages of 4 and 12 participated in the study. Using the CSHQ questionnaire (with a cut-off score >41), 88.5% of the children were found to have sleep disturbances. According to the PSQI questionnaire, 33% of mothers and 41.2% of fathers were identified as having poor sleep quality. Poor parental sleep quality was correlated with children's sleep disturbance and several sleep problems, including bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, and night waking.

The National Sleep Foundation (NSF) recommends that children aged 3 to 5 should get 10 to 13 hours of sleep, those aged 6 to 13 should receive 9 to 11 hours, and teens aged 14 to 17 should obtain 8 to 10 hours.[25] In our study, the mean total sleep duration for children was 9.3 hours. In a study recently conducted by Ünsal et al.[26] in our country, the total daily sleep time of children was found to be 9.33±1.09 hours. The NSF recommends 7-9 hours of sleep for adults; in our study, the mean total sleep time was 7.0 hours for mothers and 6.8 hours for fathers. These findings showed that the children and parents in our study were at the lower limit of optimal sleep duration. Additionally, based on the CSHQ questionnaire, which is valid and reliable for assessing children's sleep habits in our country, 88.5% of the children were found to have sleep disorders. Recent meta-analyses have shown that the global prevalence of sleep disorders in children and adolescents has reached the alarming levels of 54% and 34%.[7,8] Similarly, a recent study conducted in our country found that 62.9% of children experienced sleep disturbances.[26] These findings suggest that sleep disturbance is a widespread public health problem that requires urgent attention. Given the critical role of regular and adequate sleep- in children's health and well-being, pediatricians should be aware of this issue and provide guidance to families. Moreover, school- and community-based interventions to raise awareness and promote lifestyle changes are essential for improving sleep health in children and their families.

Table 3. Sleep characteristics of children

Bedtime, hour, mean (SD)	21:31 (02:01)
Wake time, hour, mean (SD)	7:37 (00:39)
Total sleep time, hour, mean (SD)	9.3 (1.1)
WASO, minute, mean (SD)	6.5 (8.0)
CSHQ score, median (min.-max.)	49.0 (34.0-67.0)
Sleep disturbance, n (%)	108 (88.5)
Bedtime resistance, score, median (IQR)	11.0 (5.0)
Sleep onset delay, score, median (IQR)	1.0 (1.0)
Sleep duration, score, median (IQR)	3.0 (1.0)
Sleep anxiety, score, median (IQR)	8.0 (3.0)
Night wakings, score, median (IQR)	4.0 (3.0)
Parasomnias, score, median (IQR)	8.0 (3.0)
Sleep disordered breathing, score, median (IQR)	3.0 (1.0)
Daytime sleepiness, score, median (IQR)	14.0 (5.0)

A score greater than 41 on the CSHQ indicates a sleep disturbance, with higher CSHQ scores reflecting more sleep problems.

SD: Standard deviation, IQR: Interquartile range, CSHQ: Children's Sleep Habits Questionnaire, WASO: Wake after sleep onset

Table 4. Correlation analysis between parents' sleep and chronotype variables and children's sleep habits

	1	2	3	4	5	6	7	8	9	10	11
1. CSHQ score	1										
2. Bedtime resistance	**0.714****	1									
3. Sleep onset delay	**0.366****	**0.323****	1								
4. Sleep duration	**0.484****	**0.251****	**0.499****	1							
5. Sleep anxiety	**0.681****	**0.783****	0.171	0.197*	1						
6. Night wakings	**0.526****	**0.488****	0.164	0.168	**0.489****	1					
7. Parasomnias	**0.453****	**0.231***	0.100	0.082	**0.279****	**0.317****	1				
8. Sleep disordered breathing	**0.251****	0.012	0.046	**0.196***	0.088	0.060	**0.230***	1			
9. Daytime sleepiness	**0.347****	-0.103	-0.140	0.055	-0.075	**-0.199***	-0.129	-0.055	1		
10. PSQI score	**0.192***	**0.251****	**0.306****	**0.213***	**0.195***	**0.210***	0.136	0.064	**-0.202***	1	
11. MEQ score	-0.092	-0.108	-0.080	0.022	**-0.210***	-0.066	-0.093	-0.146	0.042	**-0.359****	1

Spearman Rho correlation coefficients,
*, **: Significant correlations at p<0.05, p<0.01 level, respectively. Higher PSQI scores indicate poorer sleep quality, while higher MEQ scores are related with morningness. Higher CSHQ scores reflect more sleep problems.

CSHQ: Children's Sleep Habits Questionnaire, PSQI: Pittsburgh Sleep Quality Index, MEQ: Morningness-Eveningness Questionnaire

Family structure and parental behavior play a crucial role in shaping children's lives. Parents' sleep disturbances may impact their children's sleep and vice versa. In this study, poor sleep quality was correlated with children's sleep disturbance and several sleep problems, including bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, and night waking. A meta-analysis performed by Varma et al.[28] showed associations between parents and their children regarding sleep duration, sleep quality, and sleep efficiency. Sleep problems in children were associated with poorer sleep quality and more insomnia in parents.[27] Chehri et al.[5] reported a significant association between children's sleep patterns and the sleep quality and hygiene of their parents. In the study by Varma et al.[18] children's sleep issues were found to be linked to parents' sleep disturbances.[18] Urfer-Maurer et al.[13] reported that maternal sleep problems were associated with objective sleep parameters in children, whereas paternal sleep problems showed no significant effect. Given the potential benefits of healthy sleep habits for children's future health, it is critical to consider parental sleep habits and quality. Future research is encouraged to determine the influence of family dynamics on sleep problems in both adults and children.

It is essential to highlight that in this study, children's sleep was assessed based on the mother's reports. Rönnlund et al.[17] reported that parents with sleep problems tended to have more sleep problems in their children; however, parental sleep disturbances were not related with objective measures of child sleep.[16] In the research conducted by Urfer-Maurer et al.[14] maternal insomnia was linked to children's bedtime resistance and sleep anxiety, whereas paternal insomnia was associated with children's sleep duration and daytime sleepiness. However, the objective sleep parameters of the children did not explain these associations.[13] Therefore, it was thought that future studies should examine objective sleep parameters along with parental reports.

Our findings revealed that more than half of both mothers and fathers were classified as intermediate chronotypes, followed by morning chronotypes, with evening chronotypes being the least common. This suggests that a significant proportion of both mothers and fathers may struggle to adapt to the intense demands of daily parenting. Additionally, the study found that as parental MEQ scores increased, reflecting a greater preference for morningness, children's sleep anxiety decreased and parental sleep quality improved. Consistent with expectations, higher MEQ scores, indicating a morning chronotype, were related with better sleep quality. Morales-Muñoz et al.[28] discovered that maternal chronotype was related with sleep problems in early childhood and may be regarded as a potential risk factor for the occurrence of early sleep problems. They also found that maternal eveningness was linked to shorter sleep duration in young children. However, paternal chronotype was not related with sleep parameters. It is important to recognize that parents serve as role models in shaping their children's sleep habits. Healthcare professionals should consider parents' chronotypes and lifestyles when providing guidance on optimizing sleep and addressing sleep problems in both parents and children.

Study Limitations

Several limitations of the study should be acknowledged. First, parental participation and questionnaire responses were voluntary, and both parental and child sleep status were assessed using self-report questionnaires rather than objective measurements. In addition, the assessment of children's sleep relied solely on mothers' perceptions, which may introduce bias. Finally, the cross-sectional design restricts the capacity to draw causal inferences among sleep-related variables.

In spite of the limitations, the findings of this study are valuable because they explore the relationship between parents' chronotype, sleep quality, and children's sleep habits, particularly in the relatively understudied age group of 4-12 years.

Conclusion

This study found that 88.5% of children experienced sleep disturbances and highlighted a relationship between children's sleep habits and parents' sleep quality. These results underscore the importance of addressing parental sleep health as a potential strategy for improving children's sleep health. Future research should further explore these relationships to develop comprehensive strategies that support the sleep health of both parents and children.

Ethics

Ethics Committee Approval: Ethical approval for this research was secured from the Institutional Review Board of Koç University (approval number: 2023.375.IRB3.168, date: 02.11.2023).
Informed Consent: It was obtained.

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Footnotes

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