

## BRIEF REPORT

## Poor parental sleep did not predict future sleep problems in children aged 2–6 years

Sleep problems are common in young children and may negatively affect the well-being of both children and parents.<sup>1</sup> Previous studies have reported that tired parents overestimated their children's sleep problems.<sup>2,3</sup> Poor maternal sleep, recorded using sleep electroencephalography, was associated with concurrent sleep problems in children aged 7–12 years, but paternal sleep was not.<sup>2</sup> We were unable to find any studies on whether poor parental sleep quality affected the evolution of child sleep or whether it predicted future sleep problems. This study, carried out between December 2013 and April 2018 by FinAdo study group, aimed to fill that gap in our knowledge.

The parents of preschool children, aged 2–6 years, reported their own sleep quality and we objectively analysed the sleeping patterns of their children using actigraphy on two different occasions, one year apart. This enabled us to assess whether the parents' sleep quality and children's sleeping patterns were related. Children of biological and adoptive parents were both included to minimise the effects of possible genetic dispositions on sleep problems.

Our study population comprised 178 families with 99 biological and 79 adopted children. The adoptive families had participated in the FinAdo study, which examined the health and well-being of internationally adopted children in Finland. They were contacted through the three adoption agencies operating in Finland. The biological children were recruited by handing out information letters in Finnish to day-care centres in Turku and Kaarina. Participating families provided informed consent and completed questionnaires on the well-being and socio-economical aspects of the parents and child. The child's sleep was recorded for 7 days and nights using a GENEActiv actigraph, (Activinsights Ltd, Cambridgeshire, UK)<sup>4</sup> on the non-dominant wrist. This device can record movement acceleration over time and estimate periods of sleep from lack of movement during the time spent in bed.<sup>5</sup> The device data were analysed applying algorithms that were used in the development of reference values for this age group<sup>4</sup> to obtain the 24-h sleep time and sleep-onset latency, that is, the time taken from lying in bed to sleep onset. The device also measured sleep efficiency, which represents sleep time as a proportion of the time spent in bed, and fragmentation index, which depicts restlessness during sleep. Subjective parental sleep quality was assessed using the Jenkins

Sleep Questionnaire, a four-item survey that explores sleep problems and daytime sleepiness. The actigraphy and the questionnaires were repeated one year later. Children whose sleeping patterns were successfully recorded for at least four nights at both of the study occasions, and whose parents had completed at least one of the parental Jenkins questionnaires were included in the analysis. The study protocol has previously been described in more detail.<sup>3</sup> It was approved by the ethics committee of the Hospital District of Southwest Finland.

Linear mixed modelling was used to analyse associations between reported parental sleep quality and trends in objective child sleep parameters one year apart. Statistical analyses were performed using the R statistical program R, version 4.0.3 and the lmer4 package (R Foundation, Vienna, Austria).

The mean baseline age of the 178 children (56.7% girls) was  $4.1 \pm 1.6$  years and 44.4% were adopted. The mean actigraphy measurements for the first recording were as follows:  $8.9 \pm 0.7$  h for 24-h sleep time,  $24 \pm 12$  min for sleep-onset latency,  $39.0\% \pm 8.3$  for the fragmentation index and  $78.0\% \pm 4.6$  for sleep efficiency.

The questionnaires were filled out by 176 mothers and 148 fathers with a mean age of  $38.3 \pm 5.6$  years and  $40.4 \pm 5.7$  years, respectively. The mean Jenkins sleep questionnaire scores for the mothers and fathers were  $2.4 \pm 0.9$  and  $2.3 \pm 1.0$ , respectively.

The associations between the parental Jenkins sleep questionnaire scores and the objectively recorded child sleep quality parameters are shown in Table 1. The results did not differ between adopted children and children living with their biological parents; therefore, the groups were combined. Maternal sleep quality was not associated with any of the four child sleep parameters. Paternal sleep quality was associated with the child's sleep efficiency during follow-up, but not the other three values. We assumed that this could be because of the long time that children spent in bed. The impact of paternal sleep on the child's time in bed was analysed and no association was observed, which suggests that this was probably a chance finding. Future studies may need to clarify this result.

A previous study showed that maternal, but not paternal, sleep quality was associated with objectively documented concurrent child sleep problems.<sup>2</sup> Our study showed that poor maternal sleep

TABLE 1 The effect of parental sleep quality on their children's sleep

Parental Jenkins sleep questionnaire score	Child's sleep parameters in actigraphy							
	24-h total sleep time		Sleep latency		Sleep efficiency		Fragmentation index	
	Estimate (95% CI)	p value	Estimate (95% CI)	p value	Estimate (95% CI)	p value	Estimate (95% CI)	p value
Maternal	-0.05 (-0.14-0.04)	0.242	0.00 (-0.02-0.03)	0.940	0.04 (-0.62-0.70)	0.913	-0.57 (-1.75-0.61)	0.341
Paternal	-0.03 (-0.12-0.06)	0.489	0.02 (-0.00-0.05)	0.112	-0.82 (-1.48--0.15)	0.016	0.56 (-0.65-1.78)	0.366

Note: All values are controlled for child's gender, age at baseline, adoption status and length of follow-up.

quality did not predict increased sleep problems at 3-7 years of age, but poor paternal sleep quality may have decreased the child's sleep efficiency at follow-up. Further studies are required to confirm this paternal finding.


Doctors and healthcare professionals who treat children with sleep disturbances are advised to assess parental sleep quality to make sure the parents are getting enough sleep. However, parents can be assured that their own sleep problems will not impair their preschool children's sleep patterns.

#### CONFLICT OF INTEREST

None.

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