Commentary: Comparing Actigraphy and Parental Report as Measures of Children’s Sleep

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Sleep in children can be assessed using a variety of methods. Direct observations, self-reports, parental reports, time-lapse video, actigraphy, and polysomnography have been repeatedly used in pediatric sleep research and clinical practice. Parental reports have always been a main source of information on children’s sleep. Caregiver observations, in questionnaire or diary format, can provide detailed description of the child’s sleep schedule, night-wakings, and sleep-related behaviors such as resistance to go sleep or to sleep alone, sleep walking, night terrors, and other parasomnias. Parents can also provide information about snoring, restless and disrupted sleep, or even apneic pauses, which are important markers of sleep-disordered breathing.

Over the last two decades, actigraphy has become an increasingly useful sleep assessment research and clinical tool in infants, children, and adults (Ancoli-Israel et al., 2003; Sadeh & Acebo, 2002; Sadeh, Hauri, Kripke, & Lavie, 1995); in this special issue, three of the five original research studies that examined sleep parameters utilized actigraphic measurement. Actigraphy is based on a wristwatch like device, which is attached to the child’s wrist (or the ankle in the case of infants), and provides continuous monitoring of activity level that can be translated to reliable and valid estimates of sleep–wake measures. The main advantage of actigraphy is that it provides an objective description of sleep for extended periods in the child’s natural setting. Validation studies of specific devices against standard polysomnography have yielded between 85% and 95% agreement for sleep–wake scoring.

When compared to parental reports, actigraphy has significant advantages. Parents can only report about what they are aware of during the night. If a child spends significant time in quiet wakefulness, or sleep is significantly disturbed and fragmented, but the child does not cry or call for parental attention, then the parents are less likely to be aware of and thus report about these important events (Sadeh, 1994, 1996; Sadeh, Raviv, & Gruber, 2000; Tikotzky & Sadeh, 2001). Older children are less likely to require attention when they wake up at night, and therefore their parents are less likely to be accurate in documenting their night-wakings. Another important limitation of parental reports is related to compliance when daily sleep logs need to be completed over several weeks to months, as required in many behavioral intervention studies. It has been demonstrated that, when parents are required to keep diaries for extended periods, their compliance tend to drop over time. In a study assessing behavioral interventions for infants’ night waking problems, parents failed to complete an increasing number of items on the sleep diaries from baseline to follow-up weeks (Sadeh, 1994). Obviously, if parents increasingly fail to record night-wakings on the diaries, this attrition process may create a false or inflated measure of the intervention effect.

Because actigraphy is measuring body movements, there are inherent limitations associated with using it for sleep assessment. For instance, movement artifacts are a potential source of error. When a child is sleeping in a moving vehicle or stroller, or while being rocked by a parent, then the actigraph detects movements that are likely to be interpreted as wakefulness (Sadeh, Sharkey, & Carskadon, 1994). Other measurement errors may result from a failure to appropriately attach the actigraph device, accurately record any time periods when the watch is temporarily removed, or technical failures. This is why it is highly recommended that simultaneously recorded parental reports/sleep logs be used to edit the actigraph data for potential artifacts and failures (Acebo, Sadeh, Seifer, Tzischinsky, & Carskadon, 2000; Acebo et al., 1999).

When actigraphy and parental reports were compared, high correlations were found for the sleep schedule...
variables (i.e., sleep onset, sleep duration). However, the
correlations dropped significantly when sleep quality
measures were compared (Sadeh, 2004). This suggests
that when sleep schedule variables are the primary
outcome measure, then parental reports, particularly in
the form of daily sleep logs, are sufficient in most cases.
However, when sleep quality measures are important,
actigraphy can provide additional (and in many cases
more accurate) information.

In conclusion, actigraphy and parental reports both
have limitations and strengths. The information provided
by these methods is, to some extent, overlapping, but
each method provide its own unique and valuable data.
It is therefore highly recommended that both these
methods be used as complementary sources in the
evaluation of sleep, in research as well as clinical practice
settings.

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References

Acebo, C., Sadeh, A., Seifer, R., Tzischinsky, O.,
& Carskadon, M. A. (2000). Sleep/wake patterns in
one to five year old children from activity monitoring
and maternal reports. Sleep, 23, A30–A31.

Acebo, C., Sadeh, A., Seifer, R., Tzischinsky, O.,
sleep patterns with activity monitoring in children
and adolescents: How many nights are necessary for
reliable measures? Sleep, 22, 95–103.

Ancoli-Israel, S., Cole, R., Alessi, C., Chambers, M.,
Moorcroft, W., & Pollak, C. P. (2003). The role of
actigraphy in the study of sleep and circadian
rhythms. Sleep, 26, 342–392.

night waking: Parental reports and activity-based
home monitoring. Journal of Consulting and Clinical
Psychology, 62, 63–68.

Sadeh, A. (1996). Evaluating night wakeings in
sleep-disturbed infants: A methodological study of
parental reports and actigraphy. Sleep, 19, 757–762.

infant sleep problems: Validation and findings

Sadeh, A., & Acebo, C. (2002). The role of actigraphy in
sleep medicine. Sleep Medicine Reviews, 6, 113–124.

The role of actigraphy in the evaluation of sleep
disorders. Sleep, 18, 288–302.

and sleep disruptions in school-age children.
Developmental Psychology, 36, 291–301.

Activity-based sleep-wake identification: An empirical
test of methodological issues. Sleep, 17, 201–207.

Tikotzky, L., & Sadeh, A. (2001). Sleep patterns and
sleep disruptions in kindergarten children. Journal of