

# Sleep Characteristics in Mothers of Children With Developmental Disabilities

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## ABSTRACT

Impaired sleep can contribute to conditions such as cardio-metabolic disorders, depression, and decreased immune function. Mothers of children with developmental disabilities (DDs) may be at greater risk for impaired sleep due to the sleep problems of their children. This cross-sectional study described the self-reported sleep characteristics of mothers of children (ages 6-12) with DDs by using a sleep diary and the Pittsburgh Sleep Quality Index (PSQI) as quantitative and qualitative measures of sleep in these mothers. The Consensus Sleep Diary was modified to ascertain how the child's sleep and needs for care during the night impacted the mother's sleep. The results showed that mothers had short sleep duration (nearly 40% slept <7 hours per night),

woke up an average of 2.2 times per night (most commonly due to caregiving needs of children), and had poor sleep quality (mean PSQI global score of 7.9 [SD=4.8]). The sleep problems of children with DDs may influence mothers' sleep. *J Pediatr Health Care.* (2017) ■, ■-■.

## KEY WORDS

Child, developmental disabilities, impaired sleep, mothers

Having undisturbed and an adequate amount of sleep has proven to be essential for both psychological and physical health. Impaired sleep not only contributes to increased stress and fatigue (Niu et al., 2011), but also plays a role in various poor health outcomes, such as cardiovascular (Kato, Adachi, Koshino, & Somers, 2009) and metabolic disease (van Cauter et al., 2007), and has been associated with depressive symptoms and decreased immune function (Baglioni et al., 2011; Fondell et al., 2011). The term *impaired sleep* can consist of many sleep-related difficulties such as sleep disruptions, short or long sleep duration (Zee et al., 2014), or poor sleep quality (non-restorative sleep; Roth et al., 2010). Recent studies have shown that mothers of children with developmental disabilities (DDs) experience impaired sleep (Bourke-Taylor, Pallant, Law, & Howie, 2013; Meltzer, 2008; Wayte, McCaughey, Holley, Annaz, & Hill, 2012). Given that impaired sleep has been associated with poor health outcomes in the general population, impaired sleep may also be a concern for mothers of children with DDs, because they may experience more frequent night disruptions related to their child's sleep-related difficulties.

Mothers of children with DDs increasingly experience impaired sleep, specifically sleep disruptions at night, due to their children's care (Bourke-Taylor et al., 2013). Mothers of children with DDs also reported

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shorter sleep duration at night compared with mothers of typically developing children (Meltzer, 2008). In addition, poor sleep quality in mothers of children with DDs is commonly reported and has been significantly associated with high levels of maternal stress (Chu & Richdale, 2009; Gallagher, Phillips, & Carroll, 2010; Ikeda, Nagai, Kato-Nishimura, Mohri, & Taniike, 2011), depressive symptoms (Wayte et al., 2012), and poor psychological well-being (Bourke-Taylor et al., 2013). Although impaired sleep may play a significant role in the health and well-being in mothers of children with DDs, little is known about these mothers' sleep characteristics. This article is a description of the sleep characteristics of mothers of children with DDs, focusing on use of a sleep diary by mothers as a quantitative and qualitative measure of sleep.

## BACKGROUND

Sleep is an active, cyclic, and reversible behavioral state of perceptual disengagement from the environment (Carskadon & Dement, 2005). According to the two-process model of sleep regulation (Achermann & Borbély, 2003; Borbély, 1982), both a circadian process and a homeostatic process are involved in the sleep-wake cycle, and each process is controlled by separate mechanisms. The circadian process is responsible for maintaining wakefulness. The homeostatic process is responsible for promoting sleep and is influenced by the individual's sleep-wake behaviors and the duration and quality of prior sleep. The interaction between the circadian process and the homeostatic process controls the sleep-wake cycle in which they are working against each other. For example, the homeostatic process is increased during the day and decreased during the night depending on the amount of non-rapid eye movement a person previously had during sleep (Dijk & von Schantz, 2005). On the other hand, the circadian process is accumulated during the day, working against the homeostatic process and promoting wakefulness and alertness. When a person has an adequate amount of sleep at night, the homeostatic drive for sleep is reduced, and the circadian drive is thus increased (Colten & Altevogt, 2006).

There are several potential mechanisms linking impaired sleep with poorer physiologic health. For example, short sleep duration (<6 hours/night) is reported to increase concentration of inflammatory markers and sympathetic activity as well as alter the rhythm of cortisol secretion (Reutrakul & Van Cauter, 2014). These alterations are associated with disease processes such as Type 2 diabetes and cardiovascular disease. In addition, sleep restriction can alter leptin and leptin-to-ghrelin ratio (hormones that regulate appetite) and increase hunger and appetite, which are

all associated with obesity (Spiegel, Leproult, & van Cauter, 2004). Poor sleep quality is also associated with increased inflammatory markers such as IL-1 $\beta$  (Prather et al., 2009) and altered cortisol secretion (Kumari et al., 2009).

## IMPAIRED SLEEP IN MOTHERS OF CHILDREN WITH DDS

Although studies are limited within the United States, emerging evidence suggests that mothers of children with DDs increasingly experience sleep disruptions and shorter sleep duration. For example, a recent study used self-reported data from 152 Australian mothers with school-aged children who have DDs and found that about half (49%) of the study participants experienced sleep disruptions at night because of their caregiving responsibilities for their children, and 11% of mothers who had reported sleep disruptions never slept through the night (Bourke-Taylor et al., 2013). Another study of mothers with children who have Smith-Magenis syndrome, a genetic disorder featuring intellectual disability and behavior problems, reported that mothers awoke five nights a week to care for their children (Foster, Kozachek, Stern, & Elsea, 2010). In addition, the mothers' sleep duration at night was an average of only 6.40 hours (Foster et al., 2010), which is less than the recommended duration of 7 to 9 hours per night for healthy adults (Watson et al., 2015). One U.S. study objectively measured mothers' sleep by using actigraphy, a wristwatch-like device to monitor rest-activity patterns, in mothers of children with autism spectrum disorders (ASDs). They woke 37 minutes earlier and had an average of 51 minutes shorter sleep duration per night than mothers of typically developing children (Meltzer, 2008).

Increased sleep disruptions and shorter sleep duration in mothers of children with DDs may lead to poor sleep quality. Using the Pittsburgh Sleep Quality Index (PSQI) as a global measure of sleep quality, poor sleep quality is frequently reported in mothers of children with DDs. Forty percent of British mothers of children with cerebral palsy (Wayte et al., 2012) and 34% of Japanese mothers of children with diverse DDs (Ikeda et al., 2011) reported poor sleep quality. Compared with parents of typically developing children, parents (more than two thirds of the study participants were mothers) of children with DDs reported significantly poorer sleep quality (72% in the parental caregivers vs. 22%

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