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Mad, sad and hormonal: the gendered nature of adolescent sleep disturbance

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Abstract
Up to 40 percent of adolescents experience some form of sleep difficulty, with adolescent girls often reporting higher levels of sleep disturbance and daytime fatigue than boys. This article explores the literature surrounding female adolescent sleep disturbance. The findings reveal that sleep problems in young women can be linked to girls being at an increased risk for puberty-related fatigue, sexual abuse, a higher prevalence of mental illness and sensitivity to familial disruption, and increased domestic and grooming expectations. Implications for nursing practice include initiating conversations about sleep, sleep disturbance and sleeping arrangements when working with adolescent girls. Nurses should gather accurate sleep histories, provide adolescent girls and their caregivers with information and recommend interventions to improve sleep if necessary. Nurses should remain sensitive to the confounding effects of pubertal status, menarche and the cyclic release of hormones when designing and conducting future research into female adolescent sleep disturbance.

Keywords adolescent health • adolescent sleep • female • nursing • puberty • sleep disturbance
Introduction

Adequate sleep is necessary for quality of life, yet up to 40 percent of adolescents experience some form of sleeping difficulty (Meltzer and Mindell, 2006). Adolescent sleep disturbance has been correlated with an increase in adolescent substance abuse (Bootzin and Stevens, 2005), reduced academic performance (Curcio et al., 2006), alterations in mood, cognitive ability and behaviour (Curcio et al., 2006; Meltzer and Mindell, 2006), and is indicated as a factor in a high proportion of adolescent motor vehicle accidents (Grunstein and Grunstein, 2001). In addition, the recognition of disturbed sleep can act as a marker for psychosocial disturbance, current or past sexual abuse and the onset of acute mental illness (Stores, 2001).

While some studies have found no statistical difference between genders regarding sleep disturbance (Gau, 2006; Roberts et al., 2001), many others have found higher rates of unrefreshing sleep and daytime fatigue reported by young women (Lazaratou et al., 2005; Manni et al., 1997; Tynjala et al., 1997; Vignau et al., 1997; Wolfson and Carskadon, 1998; Yang et al., 2005; Yarcheski and Mahon, 1994). That female adolescents perceive themselves to be less well rested indicates an increased susceptibility to the effects of sleep disturbance. This article will explore the literature surrounding female adolescent sleep disturbance, focusing on the causes and consequences, and highlighting the implications for nursing practice.

Sleep and sleep changes in adolescents

Sleep is a reversible state of rest, during which consciousness and responsiveness are decreased (Marieb, 2006; Stores, 2001). While no absolute theory exists regarding the function of sleep, various theories equate sleep with the restoration of mental and physical equilibrium, memory consolidation, stimulus processing, brain growth and repair of the immune system (Stores, 2001). What is known is that sleep deprivation causes an acute decline in psychological, cognitive and physical functioning (Stores, 2001).

The amount of sleep required by an individual decreases dramatically across the lifespan. Adolescents need approximately nine hours’ sleep each night (Owens, 2006). Despite research showing that older adolescents still physically require the same amount of sleep as pre-adolescents (Jenni et al., 2005; Taylor et al., 2005), alterations brought about by biological and psychosocial factors conspire to allow adolescents to stay awake later, with most young people adopting the adult requirement of seven hours sleep a night by late adolescence (Kahn et al., 1996). This can lead to adolescents staying up late at night and sleeping in on weekends to compensate (Curcio et al., 2006; Fredriksen et al., 2004), resulting in a perpetual jetlag-like state (Dahl and Lewin, 2002). According to Curcio et al.
(2006) this contributes to the development of sleep disturbance and waking difficulties.

The findings are contradictory regarding the different sleeping patterns adopted by male and female adolescents. While Laberge et al., (2001) found girls sleeping later on weekends, Wolfson and Carskadon (1998) found no correlation between extended weekend sleep and gender. However, several studies have found that adolescent girls get up earlier than boys on weekdays, which is postulated to be for more intensive grooming routines or to perform domestic duties (Gau and Soong, 1995; Wolfson and Carskadon, 1998; Yang et al., 2005). Fredriksen et al. (2004) used a cross-domain latent growth model to analyse data from 2259 American adolescents (aged 11–14) as they travelled from grade 6 to grade 8. As they had originally hypothesized, the levels of sleep decreased for all adolescents; however, this decrease occurred at a younger age in the females. Fredriksen et al. comment that ‘these differences are a disturbing reminder of how early gender role expectations may come into play’ (2004: 93).

The problem with periods: sleep and the menstrual cycle

There are methodological challenges inherent in the study of female sleep, given the confounding effect of the cyclic release of hormones (Manber and Armitage, 1999). After a flurry of preliminary interest from researchers, this issue has been largely ignored and not controlled for in studies (Manber and Armitage, 1999). Many papers refer to the links between puberty and sleep issues in girls without elaborating on what these effects might be (see for example Camhi et al., 2000; ter Wolbeek et al., 2006).

Takeuchi et al. (2003) surveyed 276 Japanese junior high students (12–15 years) and found that 12 months after menarche onset, girls had a change in sleep/wake cycles, preferring to stay awake later and sleep longer in the morning. Similarly, in a sample of 11–12 year-old American girls \(N = 275\), Carskadon et al. (1993) found that pubertal onset had a much more profound effect in delaying bedtimes than psychosocial factors. Carskadon et al. hypothesized that this was due to the contrary association of melatonin and luteinizing hormone secretion across pubertal development.

Menarche has been associated with fatigue in several studies. Cleckner-Smith et al. (1998) found that 33 percent of their adolescent sample \(N = 75\) reported daytime sleepiness and decreased energy as a premenstrual symptom. In a longitudinal study of 3454 Dutch secondary school students, lower age at menarche was associated with higher levels of fatigue. Despite comparable levels of activity, more girls (20.5%) reported feeling extremely fatigued than boys (6.5%; ter Wolbeek et al., 2006). While the authors suggest that severe fatigue could reflect ‘an increased burden on physiological systems, i.e. a disturbance of central stress-regulatory systems’ (ter Wolbeek et al., 2007a: 172), in follow-up
studies of female-only samples, persistent fatigue was not accompanied by immune system changes or cortisol secretion dysregulation (ter Wolbeek et al., 2007a, 2007b). The authors hypothesize that an elevated incidence of fatigue in adolescent girls is related to suffering higher rates of co-morbid psychological and somatic problems than boys (ter Wolbeek et al., 2006).

While examining the correlation between pubertal status and sleep disturbance in American adolescents, Knutson (2005), found that age-matched adolescents varied significantly in pubertal staging, with 83 percent of female respondents (N = 1270) aged 12–16 already reaching menarche which occurs late in puberty (Dahl, 2004; Knutson, 2005). The male respondents (N = 1069) were predominately at the lower stages of puberty. In both genders, advanced pubertal status was associated with decreasing total sleep time. However, only in females was advanced pubertal status correlated with an increased risk of insomnia and daytime fatigue, despite sufficient sleep.

Too sad to sleep: sleep and depression

Female gender and poor psychological health are commonly associated with sleep disturbance (Patten et al., 2000). Following puberty, depressive symptoms are common in young women, escalating in incidence after the mid-teens (Patton et al., 2000). In an Australian survey of youth in 2004–5, 19 percent of females aged 18–24 reported very high levels of psychological distress, 7 percent reported post-traumatic stress disorder, and 1 in 10 disclosed a substance abuse disorder (Australian Institute of Health and Wellness, 2007).

Sleep disturbance, especially insomnia, has been found to precede first and recurrent episodes of major depressive disorder. In a survey of Victorian youth (N = 2032) over a 30-month timeframe, Patton et al. (2000) found females to be five times more likely than males to experience a depressive episode. Extreme fatigue and sleep disturbance were more prevalent in adolescents with depressive symptoms. Similarly, a nationwide cross-sectional survey of Japanese adolescents (N = 99,668) found the prevalence of poor mental health increased as the school grade advanced, and was reported by up to 50 percent of girls compared to 39 percent of boys. The researchers reported poorer mental health scores in those adolescents who slept for fewer than seven hours or more than nine hours a night (Kaneita et al., 2007). Similarly, a small survey of American college students (N = 191) found an incidence of reported sleep difficulties almost double in women compared to men, again attributed to a higher incidence of depression, anxiety and somatic complaints (Buboltz et al., 2001).

While examining the correlation between psychiatric co-morbidity and sleep disturbance, Gau and Soong (1999) found an increased prevalence of sleep terrors and sleepwalking in adolescents who suffered from anxiety, panic, suicidal ideation and who used alcohol or tobacco. Sleep disturbance has been
reported in adolescent girls with eating disorders, although it has not been established whether the reduction in slow-wave sleep, frequent waking and reduced sleep efficiency are due to the eating disorder or underlying pathopsychology (Nobili et al., 2004).

**Too scared to sleep: sleep and sexual abuse**

Sleep disturbance could be indicative of current or past sexual abuse, as abused adolescents may have difficulty relaxing vigilance which is required to achieve deep sleep (Dahl, 2004; Stores, 2001). Adolescents who have been sexually abused may have difficulty going to sleep, wake frequently, suffer nightmares and experience poorer quality sleep and daytime fatigue (Noll et al., 2006). In a 10-year longitudinal prospective study, Noll et al. (2006) assessed 147 American adolescent and young women for sleep disturbance. The objective of this study was to determine sexual abuse as a cause of sleep disturbance independent of co-morbid pathopsychology. The researchers found that women who had suffered ‘milder sexual abuse’ (defined by the perpetrator not being the biological father, that the abuse was less violent or of shorter duration) had more disturbed sleep. They attribute this to girls who were ‘mildly abused’, appearing asymptomatic following disclosure and not receiving intensive counselling. The researchers also hypothesize that an increase in daytime sleepiness common in adolescents, compounded by sleep disturbance, could contribute through decreasing vigilance and decision-making skills to recurrent physical and sexual victimization.

**Too stimulated to sleep, sedated to wake: sleep and substances**

In order to counter daytime tiredness, girls may attempt to self-medicate with psychoactive substances in order to increase daytime alertness or achieve sleep (Bootzin and Stevens, 2005). Given the associations between poor mental health and adolescent girls, and poor mental health and substance abuse, adolescence represents a danger period for girls developing addictions which could follow them into adulthood (Bootzin and Stevens, 2005). A French survey of adolescents ($N = 3287$) aged 12–20 years and their parents found that 27.5 percent of female adolescents, compared to 13.8 percent of males, used tranquilizers or hypnotics either for anxiety relief or to induce sleep. The researchers commented on the increase in the use of psychotropic drugs in girls as they age, and the perpetuation of this use into adulthood (Ledoux et al., 1994).

While statistically females are less prone to engage in illegal drug use than males, when girls do use, studies suggest that they are more likely to experiment
with harder drugs such as amphetamines and opioids (Bootzin and Stevens, 2005). When correlating data from a US survey of adolescent substance use, Johnson and Breslau (2001) found that associations between sleep disturbance and the use of tobacco, alcohol and drugs were more apparent in female adolescents than male; however, the statistical significance declined when psychiatric problems were controlled for. Cigarette smoking has been correlated with sleep problems in several studies of adolescents (Patten et al., 2000; Tynjala et al., 1997; Vignau et al., 1997). A survey of 4000 Finnish adolescents found that girls were more likely to exhibit somatic illness and have a predilection for tobacco use (Tynjala et al., 1997). In other studies, higher levels of tobacco use in adolescent females have been associated with depressive disorders (Coelho et al., 2002).

While no studies were located that discussed adolescent girls, alcohol and sleep specifically, what became apparent during the course of this review was that adolescent girls are more vulnerable to the neurotoxic effects of alcohol (Caldwell et al., 2005). Caldwell et al. (2005) also point out that only during adolescence do females statistically match males drinking rates.

Too stressed to sleep: sleep and family life

Any girl who is sleeping poorly is more likely to have difficulty regulating her emotions and maintaining a positive relationship with her parents (Patten et al., 2000). Dahl and Lewin (2002) write that sleep deprivation can magnify an adolescent’s emotions, making them more likely to cry if sad, become uncontrolled when laughing and more aggressive when angry. Parents can become frustrated with their emotionally labile offspring, and misinterpret daytime sleepiness as laziness or disinterest (Givan, 2004). This can cause a loss of self-esteem if the adolescent is denigrated by parents and other adults for lack of motivation (Givan, 2004).

Vignau et al. (1997) found higher rates of sleep disturbance in adolescents who had experienced familial disruption. The parental rate of separation or divorce in the sample experiencing sleep disturbance was double that of those who reported sleeping well. This was more apparent in the female subgroup of their sample, suggesting that adolescent females were more affected by the home environment. This concept is supported by a Finnish study of adolescent sleep conducted by Tynjala et al. (1999), which found that 15-year-old girls who had a positive relationship with their parents had higher self-esteem, engaged in more health protective habits and reported good subjective sleep quality.

In a time-diary study of a nationally representative sample of American youth (N = 2454), Adam et al. (2007) found that positive parenting behaviours, a structured environment and parental warmth correlated with improved child and adolescent sleep. This prompted them to make recommendations that parents try and regulate weekday and weekend sleep time in order to avoid
dramatic variances and allow sufficient time asleep. They also counsel against parents relaxing bedtimes as children age into adolescence, but admit that the biologically-induced tendency for adolescents to fall asleep later makes this difficult to achieve.

**Implications for nursing practice**

Facilitation of sleep and rest falls well within the boundaries of nursing responsibility. Implications for nursing practice include a need for assessment of adolescent girls’ sleeping habits, providing education to young women and their caregivers about sleep hygiene and sleep disturbance, and development of supportive interventions to facilitate effective sleeping patterns.

**Assessment**

Nurses should ask adolescent girls as well as their families about their sleeping patterns, as research shows that despite sleep disturbance being a major concern, this information is rarely volunteered during health assessments (Lee and Ward, 2005; Riter and Wills, 2004). In addition, school and leisure time routines, bedroom arrangements, nocturnal behaviour, daytime functioning, use of substances and behaviour should be examined (Meltzer and Mindell, 2006). Sleep histories should include an assessment of the living arrangements of the adolescent in question, because if parents do not cohabit, inconsistent sleeping arrangements could influence adolescent sleep (Meltzer and Mindell, 2006).

The literature stresses the importance of recognizing the onset of sleep disturbance in adolescents with an existing psychiatric disorder, as this is a sensitive indicator that acute onset or relapse is occurring (Mattai et al., 2006; Stores, 2001). It is important for nurses to broach the topic of sleep, as in the face of impending or recurrent mental illness, patients and their families may not see the sleep disturbance as a priority or recognize its contribution to the severity of symptoms (Lee and Ward, 2005).

Given that adolescent girls make up the majority of sexual assault victims (Titus et al., 2003), a sleep assessment can help to identify girls experiencing sexual abuse and guide treatment for those who are known victims. Krakow et al. (2001) recommend that health care professionals make a point of assessing for chronic nightmares, given that ‘nightmares may also represent a specific marker for a history of sexual trauma in abused children and adolescents’ (2001: 95). Frequent nightmares have been related to an increased predilection for suicide, particularly in depressed young women (Liu and Buysse, 2006). When caring for girls who have been the victim of sexual trauma, sleep disturbance should be treated as a priority, given that fatigue is thought to contribute to subsequent victimization (Noll et al., 2006).
Education of adolescent girls and their caregivers

Nurses should take every opportunity to educate girls and their parents about adolescent sleep needs and the changes to sleep that occur during puberty. There is a tendency for later bedtimes to be tolerated as children age, based on the common misconception that adolescents need less sleep than younger children. Girls and their parents are also likely to be unaware of the impact that puberty, especially menarche, can have upon their sleep. Education may enhance parent–child relationships by increasing understanding of the changes that girls go through, and that daytime fatigue is an expected and common symptom of puberty in young women. Education can empower adolescents and their parents to make more informed decisions about bedtimes. In addition, education should include information on the bi-directional nature of sleep disturbance and its association with daytime fatigue, poor psychological health and substance use.

Supportive interventions

The reciprocal nature of sleep disturbance and co-morbid conditions means that treating sleep problems can lessen the impact and incidence of psychological, physiological, behavioural and dependence issues in adolescent girls. Many sleep problems experienced by adolescent girls are preventable and amenable to treatment. Nurses are able to initiate a range of non-pharmacological interventions to assist adolescent girls in achieving healthy sleep. Adolescent girls should be advised to adopt a sleep routine which has consistent sleep and wake times, with minimal variation from weekday to weekend (Meltzer and Mindell, 2006). They should be encouraged to relax before sleep, engaging in winding down activities such as taking warm baths or reading. Further, they should be counselled to avoid caffeine, vigorous exercise and other stimulating activities in the evening (Kelman, 1999). The bedroom environment should be conducive to sleep: comfortable, dark and without a television (Meltzer and Mindell, 2006). Adolescent girls experiencing sleep disturbance from conditions such as impending psychological illness, substance dependence or suspected trauma should be referred for specialist treatment.

Implications for nursing research

The majority of literature regarding adolescent sleep is from a medical perspective and is not gender-specific. Given the dearth of nursing literature, there needs to be more research into adolescent girls’ sleep that is sensitive to the gendered differences in adolescent sleep disturbance. Future studies should take into account girls’ increased risk for puberty-related fatigue, higher prevalence of mental illness, increased risk of sexual abuse, increased domestic and grooming...
expectations and higher sensitivity to familial disruption. When conducting research into adolescent girls’ sleep, nurses should find ways to ensure that the confounding effects of menarche onset or pubertal status and the cyclic release of hormones are controlled for.

Conclusion

Given the possible connections between sleep disturbance, mental illness, substance abuse and sexual trauma, nurses should become more vigilant and sensitive to impaired sleep in their female adolescent patients. Proactively assessing and providing interventions for sleep disturbance in female adolescents may identify girls at risk of co-morbid conditions and threats to health, enhance parent–child relationships and assist young women in avoiding a myriad of health threats that could follow them into adulthood. Further research into the sleep habits and sleep challenges of adolescent girls will provide nursing with the evidence upon which to build effective interventions and strategies.

References


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