Recognizing and Managing Shift Work Disorder, an Underdiagnosed Condition: Improving Quality of Life

Learning Objectives
Upon completion of this activity, participants should be better able to:

- Recognize the role of circadian rhythms in sleep/wake function
- Identify the risks and comorbid conditions associated with shift work disorder
- Utilize screening questions and diagnostic tools to improve the identification and diagnosis of shift work disorder
- Implement management strategies for patients with shift work disorder that optimize sleep, alertness, and circadian rhythm alignment
- Utilize techniques to provide patient education about improving quality of life with effective management

Introduction
Shift work disorder is characterized by excessive sleepiness and/or insomnia for at least one month in association with a shift work schedule, provided the symptoms are not better explained by another sleep/wake disorder. The International Classification of Sleep Disorders: Diagnostic and Coding Manual (ICSD) recognizes shift work disorder as one of six circadian rhythm sleep disorders.¹
Approximately 18% of wage and salary workers in the United States, an estimated 21 million individuals, have work schedules that place them at risk for shift work disorder. Shift work involves a wide range of nonconventional work schedules (work before 7 AM or after 7 PM), including night shifts, rotating shifts, and early morning shifts that begin between 4 AM and 7 AM.

Studies indicate significant health risks may be associated with shift work. Persons who do shift work are at increased risk of cardiovascular (CV) and gastrointestinal diseases. Data from the Nurses’ Health Study support an association between working rotating night shifts and an increased risk of ischemic stroke. Studies have demonstrated a link between night or rotating night shifts and an increased risk of breast cancer, while a Japanese study showed a significant relationship between rotating shift work and prostate cancer.

But perhaps the most imminent and persistent problems that shift workers contend with are frequent sleep disturbance and excessive sleepiness. Drowsiness and fatigue in the work environment can lead to poor concentration, absenteeism, accidents, errors, injuries, and even fatalities. Shift workers also are more likely to drive while drowsy compared with regular schedule day workers. Irritability, depression, and other mood disorders associated with shift work and shift work disorder can lead to significant discord with family, friends, and coworkers.

Shift work encompasses many different types of occupations, among them food preparation, healthcare, police, firefighters, security, IT services, management, entertainment, hospitality, cleaning, production, manufacturing, construction, and transportation services.

Shift work disorder is under-recognized, underdiagnosed, undertreated, and under-represented in published clinical studies. Clinicians and patients often do not recognize the risks, consequences, and comorbidities associated with shift work disorder and the significant impact that it can have on quality of life. If patients are diagnosed and symptoms effectively managed, patients may experience improvement in health, functioning, job performance, safety, personal relationships, and overall quality of life.

The Role of Circadian Rhythms
Understanding the role of circadian rhythms in sleep/wake function can aid clinicians in identifying and managing patients with shift work or other circadian rhythm sleep disorders.

Circadian rhythms describe physical, mental, and behavioral variations that follow a 24-hour cycle. These rhythms are controlled by biological clocks that exist in groups of interacting molecules within individual cells throughout the body. The “master circadian clock” is known as the suprachiasmatic nucleus (SCN). The SCN responds primarily to cues of light and darkness as well as other environmental cues.

Circadian rhythms are present in neuronal as well as nonneuronal cells. Most circadian rhythms are controlled by the SCN, two collections of 20,000 neurons located on either side of the hypothalamus. The SCN is the site of the central pacemaker capable of synchronizing these cellular rhythms to produce observable circadian rhythms in different physiologic and behavioral measures. Cells in the SCN synchronize physiologic functions such as protein synthesis for metabolic pathways, including glycolysis, gluconeogenesis, fatty acid metabolism, and...
cholesterol metabolism.\textsuperscript{16} Other processes affected by the circadian clock include cognition, motor activity, body temperature, blood pressure changes, heart rate, urine production, and gastrointestinal function.\textsuperscript{17} Disruption of normal synchronization among skeletal muscle, adipose tissue, liver, hypothalamus, and pancreas likely accelerates insulin resistance, insulin insufficiency, and dyslipidemia, the hallmarks of cardiometabolic syndrome. Disruption of circadian clocks within the heart and vasculature, in the face of a dysregulated metabolic milieu, would accelerate cardiovascular disease.\textsuperscript{18} The SCN also activates the adrenal gland, which releases the stress hormone cortisol in the morning and aids arousal from sleep.\textsuperscript{19}

The daily human pattern and timing of consolidated sleep and normal wakefulness is strongly influenced by the timing of exposure to light and darkness. In the morning, photoreceptors in the retina are stimulated by daylight and create signals as they move along the optic nerve to the SCN and the pineal gland,\textsuperscript{20} where melatonin secretion is stimulated by darkness at a specific circadian phase and inhibited by light. In response to the light-induced signals, the pineal gland suppresses melatonin production (see Figure 1).

**FIGURE 1. Circadian Timing System**

When darkness falls, the opposite occurs. The SCN triggers the release of melatonin in the body, suppressing the SCN-alerting signal, resulting in the onset of drowsiness, and facilitating the transition from wakefulness to sleep.

As the day progresses, the sleep homeostatic drive increases, reaching a maximum near the conventional sleep time.\textsuperscript{21} The circadian signal increases proportionately in opposition, counterbalancing the progressive accumulation of sleep load and maintaining normal wakefulness.

Circadian rhythm sleep disorders can occur when there is a misalignment between the timing of sleep and the desired sleep/wake cycle, leading to impaired functioning, safety issues, and associated morbidities.\textsuperscript{1} Shift work generally requires an individual to be awake and functioning
when the biological signal for alertness is low and sleeping when the circadian signal for wakefulness is high. Not all shift workers develop circadian rhythm disruptions. The critical factor appears to be the individual’s ability to shift circadian phase to a new circadian schedule.

In addition to light and melatonin, social and environmental cues can entrain the circadian rhythm; similarly, circadian misalignment can negatively impact social interactions. Many, if not all, mood disturbances have a circadian component.\(^2\)

**Risks, Comorbid Conditions, and Quality-of-Life Issues**

Working shifts can lead to both short- and long-term problems with excessive sleepiness and insomnia as well as serious medical conditions. Drake et al found that the prevalence of insomnia or excessive sleepiness was 32% of night shift workers and 26% of those who worked rotating nights. Accidents due to sleepiness among shift workers meeting the criteria for shift work disorder was double that of non-affected shift workers.\(^3\)

Gastrointestinal problems such as ulcers and functional bowel disorders have also been associated with shift work. The rate of ulcers was about four times higher among persons working nights and rotating shifts than on other types of shifts.\(^4\) In a study of 399 nurses, those working rotating shifts had a significantly higher prevalence of irritable bowel syndrome versus day shift nurses (48% vs 31%).\(^5\) Abdominal pain was also more common among those working rotating shifts compared with day shift (81% vs 54%) and night shift workers (61%). An earlier study by Lu et al also found a higher prevalence of functional bowel disorders, including irritable bowel syndrome, among nurses working rotating shifts.\(^6\)

Shift work has also been associated with coronary heart disease, especially among those working rotating shifts for an extended amount of time.\(^7\) Shift work may also be a risk factor for lipid-profile disturbances\(^8\) and for ischemic stroke.\(^9\)

Another ominous consequence of working shifts may be an increased risk of breast cancer in female workers. Results of several epidemiologic studies suggest that women who work night shifts over a long period of time (>20 years) have a small but elevated risk of developing the disease.\(^10\) Data suggest an association between rotating shifts and prostate cancer in men\(^11\) and an increased risk of colorectal cancer in women who worked rotating night shifts for 15 years or longer.\(^12\) The International Agency for Research on Cancer, part of the World Health Organization, has listed shift work that involves a circadian disruption as a probable carcinogen in humans.\(^13\)

Shift work was associated with a higher risk of being overweight/obese in a cross-sectional study of 2,494 female nurses and midwives (1,259 day and 1,235 shift workers).\(^14\)

**Quality-of-Life Consequences**

Shift work and, especially, shift work disorder are associated with various potential quality-of-life consequences. These include mood disorders, particularly depression, which along with missed family and social activities (see Figure 2) can contribute to discord in personal and professional relationships.\(^15\) In a population-based sample, Drake et al found that among workers on the night or rotating shift, depression was significantly more common in those with insomnia.
or excessive sleepiness— the symptoms of shift work disorder. These shift workers also had a significantly greater number of missed family and social activities. Elevated blood pressure and menstrual irregularities have also been associated with shift work disorder. Elevated drug and alcohol use in shift workers may be the result of attempts to improve sleep/wake function.

FIGURE 2. Shift Work Disorder: Significantly More Missed Family and Social Activities

According to the National Sleep Foundation’s 2008 Sleep in America telephone poll, relative to day workers, shift workers were at increased risk of falling asleep at work ($P=.041$) or having an occupational accident in the past year ($P=.01$). Compared with day workers, those classified as at risk of shift work disorder were found to have increased odds for impatience ($P=.018$), avoiding interactions with co-workers ($P=.004$), and falling asleep at work ($P=.005$).

Among 1,168 married adults, night work was associated with reports of greater marital instability and negative family-work spillover. Shift work was found to be a risk factor for development of work-family conflict among men—but not women—in an analysis of 2-year follow-up data from the Maastricht Cohort Study on "Fatigue at Work" (n=12,095).

Nonstandard work hours (afternoon, night, rotating, or variable hours or weekend work) were associated with higher self-reports of burnout, emotional exhaustion, job stress, and psychosomatic health problems (n=272 on standard hours, n=109 on nonstandard hours). Compared with those on fixed day shift, workers on a fixed afternoon/evening or fixed night shift reported significantly fewer physically healthy days out of the past 30 days. Compared with those on a fixed day shift, workers on a fixed night shift reported significantly fewer mentally healthy days out of the prior 30 days.

Excessive sleepiness and fatigue pose important safety concerns, both for the individual and society at large. Major accidents, including Three Mile Island, Chernobyl, Bhopal, and the Exxon Valdez, all occurred during the early morning hours, when alertness would have been at the lowest and judgment errors were more likely to occur. Pooled data from several studies show that relative to the morning shift, risk of injury and accident increased by 18% on the afternoon
Impaired work performance and mental fatigue are also associated with shift work. Both clinicians and patients should be aware of the dangers of drowsy driving. According to one study, getting fewer than four hours of sleep has an effect similar to that of legal intoxication. Shift workers are more likely to drive while drowsy as compared with the rest of the population, putting them at high risk of a collision. They are also significantly more likely to fall asleep at the wheel.

**Screening and Diagnosing Patients With Shift Work Disorder**

Clinicians need to be alert to elements in a medical history that may indicate the presence of shift work disorder in patients with nonconventional work schedules, so that the condition can be adequately remedied. Besides excessive sleepiness and insomnia, symptoms of shift work disorder may include poor concentration, impaired performance, headache, irritability or depressed mood, and lack of energy. Symptoms of shift work disorder can be nonspecific and may mimic other sleep/wake disorders or other medical or psychiatric conditions.

Patients and even many clinicians often do not consider adequate sleep/wake function to be a priority. Patients usually do not bring up sleep issues with their healthcare providers or describe symptoms that could indicate shift work disorder, and may not associate their symptoms with their work schedule. Clinicians, therefore, must be proactive in obtaining a work history and information about sleep/wake schedules during visits for sleep-related symptoms, accidents, work-related complaints, and the comorbidities as previously described, and always during routine well visits.

Patients should be asked the following screening questions:

- Do you have difficulty sleeping?
- Do you often feel tired or sleepy at work or other times when you need to be awake?

If the answer to either of the above is positive, the clinician should ask:

- What are your sleep times?
- What are your work hours?

If a patient reveals shift work status, insufficient sleep duration, or symptoms such as insomnia or excessive sleepiness that could indicate shift work disorder, the clinician should ask the following:

- Do you often struggle to stay awake, or have you ever fallen asleep while driving to or from work?
- Do you often have difficulties with your concentration, memory, or ability to pay attention?

A diagnosis of shift work disorder can be made solely based on the patient’s sleep/wake history, without the need for specialized testing or polysomnography (see Figure 3). The clinician should consider administering the Epworth Sleepiness Scale, a quick and helpful tool for determining
the severity of sleepiness and, hence, the risk of an accident and the need to intervene (see Tool/Care Kit). 39

FIGURE 3. Making a Diagnosis of Shift Work Disorder

A physical examination should be performed to determine possible underlying or associated medical conditions or other types of sleep disorders that may be causing symptoms. The presence of snoring, for example, as well as neck circumference (>17 in for men and >16 in for women), body mass index >35, and higher Mallampati Scale score of 3 or 4 could indicate obstructive sleep apnea, which is differentially prevalent in shift-working populations. 40 The Mallampati Scale ranges from Class I, where the entire tonsil is clearly visible, to Class IV, where only the hard palate is visible, indicating an increased risk of obstructive sleep apnea. 41

Keeping a sleep/wake log for one to two weeks can give clinicians a more detailed view of sleep/wake patterns and facilitate assessment of sleep duration and quality and especially timing and regularity. 42

Differential Diagnosis
Before a diagnosis of shift work disorder can be confirmed, other potential causes and contributors of excessive sleepiness and insomnia must be considered. Potential underlying factors include medical or neurological problems, substance abuse, and the misuse of stimulant or sedative medications. The clinician also should consider mood disorders, especially depression; hypothyroidism; other sleep/wake disorders, particularly obstructive sleep apnea and restless legs syndrome; and Parkinson’s disease.

Several diagnostic tools can assist the clinician in making a differential diagnosis (see Tool/Care Kit). Since both depression and shift work disorder can manifest as impairment in memory and
concentration and may result in apathy and lethargy, it is advisable to ask a patient who seems depressed about his or her sleep/wake habits. Using the Patient Health Questionnaire-9 screener for depression\textsuperscript{43} can help diagnose major depressive disorder.

The Insomnia Severity Index is a reliable and valid instrument used to quantify insomnia severity.\textsuperscript{44} Polysomnography and daytime multiple sleep latency testing are not needed to diagnose shift work disorder and are not recommended for the routine evaluation of insomnia unless another sleep disorder is suspected or the patient is not responsive to traditional treatments.

Another diagnostic tool is actigraphy,\textsuperscript{1,45} most commonly used in the sleep clinic setting. This wristwatch-like device that records activity\textsuperscript{46} is available for use in primary care to help evaluate patients with suspected shift work disorder (see Tool/Care Kit). The actigraph output scan is typically used to estimate sleep onset and duration based on the relative lack of movement during sleep.

**Treatment**

An ideal solution for shift work disorder and the consequences of shift work is to stop shift work and revert to a day shift schedule. Patients in whom shift work disorder is more likely—those with more comorbidities, those who are older, smokers, and drinkers—should especially be advised to switch to a normal work shift schedule. However, often this is not possible, and the clinician and patient must collaborate to optimize symptom management and minimize risk.

Insomnia, awake-time sleepiness, and circadian misalignment are the focus of management. Optimizing circadian realignment can increase sleep duration and alertness.\textsuperscript{35,47} Treatment strategies must be individualized to each patient and type of shift. The management of shift work disorder may include proper sleep/wake hygiene measures, lifestyle changes, adjustments to the patient's environment, behavioral therapy, and the use of pharmacologic agents.\textsuperscript{47} Effective management of symptoms can optimize sleep and alertness and greatly enhance the patient's quality of life (see Figure 4 and Case Study).
Increasing Sleep Duration

Treating insomnia and increasing the duration and quality of sleep is an important primary goal of treatment. Most patients can benefit from implementing sleep/wake hygiene measures for shift work disorder-related sleep disturbances (see Table).12

TABLE. Sleep/Wake Hygiene Measures for Shift Work Disorder

- Create a pleasant and relaxing environment that is conducive to sleep
- Avoid caffeine,* nicotine,* other stimulants, and alcohol* too close to bedtime
- Avoid large meals close to bedtime*
- Keep the room temperature comfortable, neither too hot nor too cold
- Minimize noise and light*
- Allocate adequate time for sleeping
- Try to keep regular sleep and wake times; minimize differences on days off
- Avoid stressful or stimulating activities close to bedtime
- Get regular exercise but not within several hours of going to sleep
- Darken the bedroom and the passage to the bathroom at home

Although it is not always possible, patients should try to keep a consistent sleep/wake schedule even on days off to help realign circadian rhythms.

Melatonin administration prior to daytime sleep improved daytime sleep and causes a shift in circadian phase in some, but not all, night shift workers. Melatonin use has not been shown to improve sleepiness/fatigue during the night shift.

Several studies have evaluated the use of benzodiazepines and other benzodiazepine receptor agonists for insomnia associated with shift work disorder, with varying results. Both triazolam (0.25-0.5 mg) and temazepam (20 mg) have demonstrated efficacy in increasing the duration of daytime sleep, but without consistent effects on alertness.

There have been multiple clinical trials conducted using hypnotics for other types of insomnia, with a positive effect on daytime sleep. However, the risk-benefit ratio for shift workers is less clear, and clinicians need to consider nighttime performance and safety issues when selecting a hypnotic. It must be kept in mind that some of these medications can potentially worsen coexisting sleep conditions such as sleep-related breathing disorders and sleepiness during the night shift.

**Increasing Alertness**

Even when the insomnia of shift work disorder is treated, sleepiness during waking hours typically persists. Increasing alertness during wake times can be achieved using a variety of modalities, including bright lights and pharmacologic agents.

**Bright light.** Exposure to bright light and avoiding light are both effective in realigning circadian rhythms to a new schedule. The workplace should be well lighted to improve alertness, but then night workers should wear sunglasses on the way home from work to diminish the impact of light in preparation for sleep. Timed exposure to bright light has also been found to be an effective entrainment therapy, and, in simulated shift work studies, it promoted phase shifting and circadian realignment.

Some studies have also found that periodic exposure to bright light (2,350 to 12,000 lux) administered in 20-minute intervals during the course of a night shift resulted in subjective improvements in work-time performance tasks, alertness, and mood compared with exposure to ordinary light (often <500 lux).

Patients should minimize light exposure prior to bedtime and avoid light during sleep hours. At home, they should darken the bedroom using light-blocking curtains and dim the lights in the bedroom, bathroom, and passage in between. Relieving symptoms and allowing better adjustment to the work schedule can ultimately improve the patient’s overall quality of life.

**Planned napping.** Planned napping before the night shift is another strategy to improve alertness and performance among night shift workers. Naps are usually one-half hour to one hour long, taken an hour or so before starting the night shift. In simulation studies and trials among actual shift workers, napping increased alertness and vigilance, improved reaction times, and reduced the incidence of accidents during the night shift. The clinician should establish set times for the major sleep periods, naps, and wind-down period.
Caffeine. Stimulants such as caffeine and prescription pharmacologic agents can also boost alertness during the work shift. Caffeine, regularly consumed in small amounts every few hours, has shown efficacy in increasing alertness and counteracting sleepiness in simulation studies and one well-controlled field study.52

Pharmacologic agents. For some patients, pharmacologic agents may be needed to restore alertness and counteract excessive sleepiness. Armodafinil and modafinil are the only two agents approved by the Food and Drug Administration for improving wakefulness in patients with excessive sleepiness associated with shift work disorder. Armodafinil, the newer agent, is one of two enantiomer components of modafinil.53 Late-day plasma concentration of armodafinil is higher than that of modafinil.

In a randomized trial by Czeisler et al, the use of armodafinil in night or rotating shift workers with shift work disorder significantly improved wakefulness during scheduled night work and elevated the mean nighttime sleep latency above the level of severe sleepiness during the daytime.54 It also significantly improved measures of overall clinical condition, long-term memory, and attention and reduced self-reported sleepiness during work and the commute home.

A randomized, placebo-controlled, phase IV study recently confirmed the efficacy of armodafinil in improving excessive sleepiness associated with shift work disorder in 383 night shift workers. Results showed a significant improvement (P<.0001) in 77% of patients taking armodafinil compared with 57% using placebo, as measured by improved Clinical Global Impression of Change (CGI-C). Armodafinil also significantly improved functional status (P<.0001), as measured by the Global Assessment of Functioning (GAF).55

Modafinil, the “older” version of the drug, reduced sleepiness compared with placebo in one study of 209 shift workers who received 200 mg of modafinil before the start of each shift.56 There was also a significant improvement in performance compared with placebo, and use of modafinil did not appear to affect sleep.

In another study, Erman et al found that 300 mg of modafinil significantly improved mean Functional Outcomes of Sleep Questionnaire (FOSQ) total score compared with placebo.57 Both the 200 mg and 300 mg doses significantly improved mean 36-item Short Form Health Survey (SF-36) mental component scores relative to placebo. The authors note that the use of modafinil improved overall well-being, even with intermittent use.57

Both drugs, while generally well tolerated, have the potential for side effects, including headache, nausea, dizziness, and insomnia, as well as serious rash that required revised labeling.55,56 Clinicians need to discuss potential adverse effects and weigh the benefits versus risks with each patient. Both decrease the effectiveness of oral contraceptives. Both are Schedule IV drugs. It is important to emphasize to patients taking these drugs that they must also practice good sleep/wake hygiene measures and appropriate light and dark exposure.

Referral for sleep consultation should be considered if the clinician feels uncomfortable managing sleep/wake issues, if there is a high likelihood of comorbid intrinsic sleep/wake disorders, or if treatments do not resolve sleep-related symptoms.
Case Study: A 43-Year-Old Asian Food-Processing Plant Manager With Sleepiness on the Rotating Night Shift

Dorhee is a 43-year-old Asian woman who has worked for a food-processing plant in California for the past 10 years on the day shift. About three months ago, she was promoted to manager contingent on working a rotating shift. She presents to her family practitioner complaining of fatigue and an inability to stay awake during her night shift rotation.

Dorhee’s shift rotates every four weeks. During her first month as manager, she worked the day shift and during the second month, the afternoon shift, with no problems adjusting to the schedule. But when it came time for the night shift, she could not adjust. She says, “Since I started working rotating shifts, I have had difficulty staying awake at work when I work nights. But I never have trouble when I work the day or evening shift.”

Initially, Dorhee also had difficulty sleeping during the day. After she read about and implemented a few effective sleep/wake hygiene measures, such as using light-blocking curtains in her bedroom, minimizing noise, and careful caffeine consumption, her daytime sleep improved and is no longer a problem.

However, Dorhee still cannot stay fully awake and alert during the night shift. During that time, she is less attentive and less able to keep up with the demanding pace and feels that her lack of alertness is affecting her decision making. She is worried about making mistakes or dozing off on the job and possibly losing her promotion. Since Dorhee also has a 30- to 40-minute commute to work, she is also concerned about nodding off behind the wheel and having an automobile accident.

Her sleepiness also is taking a toll on her family life. Dorhee feels that her fatigue is making her more irritable and affecting her ability to enjoy her time off with her husband and 12-year-old daughter. She wants help dealing with her lack of alertness, her sleepiness on the job, and her irritability before starting her next night shift rotation.

Generally when on night shift, Dorhee goes to bed within an hour of getting home and gets about 5½ hours of sleep. Sometimes, she will take a 30- to 60-minute nap prior to going to work, but at about 1 AM or 2 AM, she starts struggling to stay awake on the job. The sleepiness worsens as her shift progresses, and it lasts until she gets home and goes to bed. She drinks a cup of coffee before leaving for work and usually two more cups during her shift. Dorhee stops drinking coffee by 3 AM, as she does not want caffeine to interfere with her ability to fall asleep when she goes to bed.
Case Study: cont.

On weekends, she switches to a conventional day/night schedule. She goes to bed about 11 PM and sleeps soundly through the night.

**Diagnosis and Treatment**

The clinician obtains all other pertinent history, including past medical history, medications, and family and social histories, and then conducts a brief physical examination; findings are essentially normal. Dorhee is healthy, with no underlying medical conditions, and her family history is also benign. She rarely drinks alcohol and has never smoked cigarettes, and the only medications she takes are oral contraceptives.

Based on the patient’s presenting symptoms and medical and occupational histories, the clinician makes a diagnosis of shift work disorder.

The clinician asks Dorhee whether she can switch to a permanent day shift, but she replies that is currently impossible. Therefore, to help minimize her symptoms, the clinician starts by encouraging Dorhee to continue her sleep/wake hygiene measures to support her daytime sleep. To address her continued nighttime sleepiness and inability to adjust to her night shift rotation, the clinician suggests Dorhee try to extend her daytime sleep to seven hours, plus continue taking a nap before work and extend the nap time.

Another strategy is to keep the same sleep/wake schedule on her days off to help retrain her circadian rhythms to her new sleeping hours. Exposure to bright light when she awakens and during work will help her to keep awake and alert on the job. Conversely, to stimulate melatonin production and enhance her daytime sleep, Dorhee should wear sunglasses on the drive home from work and keep her bedroom dark.

The clinician introduces the possibility of prescribing armodafinil to increase the patient’s alertness and wakefulness while at work if the above measures do not help sufficiently.
Case Study: cont.

Follow-up

Dorhee returns in four weeks improved in some aspects. She is adhering to all of the strategies except for staying on a night schedule during her days off, which she says would interfere with family time and makes her too sleepy. Dorhee has managed to extend her daytime sleep to 6½ or seven hours on most days, uses bright light intermittently while in her office, and on some days can take a longer nap before work. Her wake-time alertness is a bit better, but she is still tired and sleepy, especially while working. Her clinician at this point offers her armodafinil, prescribing 150 mg to be taken one hour prior to the start of her shift. The clinician warns her against adverse effects and the possibility of serious rashes and contraceptive interactions, which are rare, but the medication must be stopped if they occur.

Dorhee returns four weeks after that and reports that she is feeling much better and is adjusting better to the night shift. The armodafinil helps her stay awake and alert while at work, and she has cut down on caffeine consumption. She has had no side effects. Consequently, she feels more alert and competent on the rotating night shift and no longer feels concerned about losing her job. She also feels less irritable with her family and enjoys spending time with them. “I feel more like a functioning human being again,” she comments.

Dorhee plans to continue using these strategies and to try to get a little more sleep during the day. She will be re-evaluated in three months.

Patient Education: Improving Quality of Life With Effective Management

Patients need to know that shift work disorder is a recognized and treatable health problem. Many patients might otherwise assume that nothing can be done about their symptoms except to change their work schedule. Counseling is needed to explain the diagnosis and the importance of managing shift work disorder. Patient education can raise patients’ knowledge and awareness of shift work disorder, motivate them to seek care, encourage them in managing their symptoms, and facilitate success of treatment.
Efficient ways to educate patients include the following:

- Hang a poster about shift work disorder and quality of life in the reception area
- Keep copies on hand for patients to fill out
  - Epworth Sleepiness Scale
  - Sleep/wake logs
  - Insomnia Severity Index
  - PHQ-9 screener for depression
- Provide patient education handouts about—
  - Possible health, functioning, and safety consequences associated with shift work disorder
  - Proper sleep/wake hygiene measures
  - Treatment options
  - Resources pertaining to shift work disorder (articles, books, websites)
  - Drowsy driving tips
  - Managing shift work disorder and improving quality of life

An understanding of how managing their symptoms of shift work disorder can enhance their quality of life may particularly motivate patients to seek care for shift work disorder and be adherent to treatment. Patients need to be aware that effectively managing their shift work disorder symptoms of insomnia and/or excessive sleepiness may help prevent associated comorbidities and enhance their overall quality of life.

Patients should be counseled that effective management can result in improved health and reduced risks of—

- Excessive sleepiness and/or insomnia
- Mood disturbance
- Impaired work performance
- Poor concentration
- Low energy level
- Disrupted personal relationships
- Safety (drowsy driving, motor vehicle accidents, errors on the job)

Management of shift work disorder can have a noticeable positive effect on daily life, with improved concentration, work performance, mood, sleep quality, and energy level. Where possible, family members and work supervisors should be educated about providing appropriate support.

Clinicians can motivate their patients by explaining and providing patient information describing how managing their shift work disorder symptoms can help improve their physical and mental health, functioning, and safety—at work, at home, and on the road. Effective management of shift work disorder equals improved overall quality of life.
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