

# Caring for the carers: Advice for dealing with sleep problems of hospital staff during the COVID-19 outbreak

Andrea Ballesio<sup>1,2</sup>  | Caterina Lombardo<sup>1</sup> | Fabio Lucidi<sup>2</sup> | Cristiano Violani<sup>1</sup>

<sup>1</sup>Department of Psychology, Faculty of Medicine and Psychology, Sapienza University of Rome, Rome, Italy

<sup>2</sup>Department of Developmental and Social Psychology, Faculty of Medicine and Psychology, Sapienza University of Rome, Rome, Italy

## Correspondence

Andrea Ballesio, Department of Psychology, Faculty of Medicine and Psychology, Sapienza University of Rome, Via dei Marsi 78, 00185, Rome, Italy.  
Email: andrea.ballesio@uniroma1.it

## Abstract

Hospital staff are at the frontline in the COVID-19 outbreak. The stressors they experience may induce sleep problems in a population already at risk. Sleep deprivation, long shifts and insomnia in hospital staff have been associated with individual, organizational and public health hazards. These include increased risk of mental and somatic disorders, altered immune responses, medical errors, misunderstandings, drowsy driving and burnout. In March 2020, the World Health Organization called for providing access to mental health and counselling for health professionals involved in the COVID-19 outbreak. To answer this call, we propose practical advice for the management of sleep problems (sleep deprivation, insomnia and shift work) that can be included in supportive interventions. The advice is based on psychobiological principles of sleep regulation and on guidelines for the treatment of insomnia and was implemented within an initiative offering psychological support to the staff of three university hospitals in Rome.

## KEYWORDS

COVID-19, infection, insomnia, pandemic, public health, sleep

## 1 | INTRODUCTION

Hospital staff are at the frontline in the COVID-19 outbreak, facing hazards that include pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence (World Health Organization, 2020). These factors may have a detrimental impact on professionals' mental and physical health, including sleep disturbances. Even before the outbreak, hospital staff were known as a population at risk of sleep problems. A recent meta-analysis estimated the pooled prevalence of sleep disturbances in health professionals at 40% (Qiu, Yu, Li, Li, & Xiao, 2020), and mostly included sleep deprivation, circadian rhythm disorders and insomnia (Weaver et al., 2018). During the COVID-19 pandemic, it is likely that the percentage has dramatically increased and may not diminish after the emergency. In fact, several factors that are detrimental to sleep are currently present. Irregular and prolonged work shifts due to extraordinary workloads impact both on homeostatic

and circadian processes that determine insufficient or inadequate sleep. The effects of the desynchronization of circadian rhythm in shift workers are well known, as well as its psychobiological consequences (see Kang, Noh, & Lee, 2020). For instance, shift workers are at higher risk of cardiovascular disease, stroke, obesity, gastrointestinal disorders and breast cancer than non-shift workers (see Brown et al., 2020 for a review). Moreover, staff involved in COVID-19 departments experience a variety of negative emotions, such as anxiety over uncertain outcomes, guilt, perception of impotence and loneliness, which activate cognitive mechanisms, including repetitive health worries, ruminations and catastrophic thinking. Although these are normal responses to stress, they may have persisting deleterious effects on sleep (Lancee, Eisma, van Zanten, & Topper, 2017). Stress, negative emotions and repetitive negative thinking are associated with problems in initiating and maintaining sleep (e.g., Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010; Lancee et al., 2017). Moreover, insufficient or disturbed sleep is associated with the risk of developing mental (e.g.,

depression and anxiety) (Hertenstein et al., 2019), somatic (e.g., cardiovascular) (Krittana Wong et al., 2019), metabolic (Bacaro, et al., 2020) and inflammatory (Irwin, 2019) diseases. It is likely that ensuring sleep quality and quantity during the emergency will protect individuals and organizations, and also public health and safety. The present paper provides a brief review of the impact of sleep disturbances on hospital staff and some advice for the management of sleep in professionals currently struggling in the COVID-19 crisis. The advice is based on well-known psychological principles of sleep regulation (e.g., Bootzin, Epstein, & Wood, 1991; Borbély, 1982), published clinical trials (e.g., Kaplan, Talavera, & Harvey, 2018) and clinical guidelines for the treatment of sleep disturbances (e.g., Riemann et al., 2017), and should be considered complementary to and compatible with the recommendations recently provided by a task force of the European CBT-I Academy (Altena et al., 2020; Bootzin et al., 1991), but specifically tailored for hospital staff under emergency circumstances. Specifically, whereas Altena et al. (2020) proposed advice to deal with sleep problems of people during home confinement and offered preliminary advice for healthcare staff, we aim to provide an in-depth specific perspective on hospital staff and the most commonly experienced sleep problems in this population, namely sleep deprivation, insomnia and night-shift work.

## 2 | EMERGENCY-INDUCED SLEEP IMPAIRMENTS

Although emergencies experienced in war scenarios or natural or hydrogeological disasters are not directly comparable to the COVID-19 outbreak, previous research provides indirect evidence on the emergency-induced sleep impairments experienced by frontline professionals. In a longitudinal study on the 2011 East Japan earthquake and tsunami, Li et al. (2011) showed that health care disruption (i.e., inability to receive appropriate medical care and facilities) predicted subjective poor sleep. Similar findings were reported in relation to the Fukushima nuclear disaster, where workers exposed to life-threatening danger and social stigma reported subsequent insomnia (Ikeda, Charvat, Shigemura, Kales, & Tanigawa, 2019). Veterans exposed to war scenarios have a higher risk of developing sleep disorders, including insomnia and sleep apnea, compared to less exposed veterans (Chao, Abadjian, Esparza, & Reeb, 2016). Importantly, in health carers the effects of emergency-related stressors may interact with job-related risk factors (e.g., irregular or prolonged shifts, sleep deprivation), inducing sleep and daytime impairments. Direct data on the role of sleep in the current COVID-19 outbreak are limited. A recent online survey showed that the 7% of adults living in Wuhan and Hubei Province, the most hit area of China, report post-traumatic stress symptoms (PTSS) and that good sleep quality may have a preventive effect on PTSS (Liu et al., 2020). Moreover, 34% of physicians and nurses in Wuhan city have reported difficulties falling asleep and/or maintaining sleep (Lai et al., 2020).

## 3 | NURSES

Nurses routinely face several work-related stressors, including heavy workload, management of communication with patients and families, shift work and overtime work (Bae & Fabry, 2018). These stressors may increase the risk of developing sleep and mental health problems (Deng, Liu, & Fang, 2020). Epidemiological data show that sleep problems among nurses range from 57% to 83% and include insomnia, insufficient sleep, sleep deprivation and poor sleep quality (Qiu et al., 2020; Zdanowicz, Turowski, Celej-Szuster, Lorencowicz, & Przychodzka, 2020). Worldwide, short sleep duration is experienced by up to 50% of nurses (Furihata, Saitoh, Suzuki, et al., 2020; Stimpfel, Fatehi, & Kovner, 2019). A large study in USA nurses showed that 68.1% reported sleeping less than 7 hr on a regular basis and 11.4% routinely slept less than 5 hr (Stimpfel et al., 2019). That is remarkably under the recommendation of the National Sleep Foundation (Hirshkowitz et al., 2015), which recommends that adults should sleep 7–9 hr per night.

Short, irregular or disturbed sleep experienced by nurses can have detrimental effects at individual, organizational and societal levels (Bae & Fabry, 2018). In nurses, poor satisfaction with, efficiency and duration of sleep have been recently associated with self-reported negative mood, whereas sleepiness is associated with loss of interest (Furihata, Saitoh, Suzuki, et al., 2020). In other recent research (Furihata, Saitoh, Otsuki, et al., 2020) it was shown that in nurses, insomnia and short sleep duration (<6 hr), often experienced in prolonged shifts, are associated with a reduction of brain-derived neurotrophic factor (BDNF). Lower serum-level BDNF concentrations in individuals with insomnia or short sleep has been previously associated with short-term cognitive lapses and depressive symptoms (see Rahmani, Rahmani, & Rezaei, 2019). Moreover, BDNF could be involved in the onset of stress-related mood disorders (Duman & Monteggia, 2006). Thus, nurses experiencing sleep problems may be exposed to short-term risk of failures and long-term risk of psychopathology. Overtime work in nurses is also linked to physical illness, including cardiovascular and musculoskeletal diseases and obesity (e.g., Caruso et al., 2017).

At the organizational level, nurses experiencing sleep problems may be at risk of critical errors. Meta-analytic studies show that sleep deprivation and insomnia impact problem-solving abilities, working memory, perceptual processing and complex reaction times (Lim & Dinges, 2010; Wardle-Pinkston, Slavish, & Taylor, 2019), which may result in job errors. Short sleep duration in nurses is associated with lower ratings of quality of care and patient safety (Stimpfel et al., 2019). Consistently, in an ecological momentary assessment study, Dorrian et al. (2006) found that nurses experiencing sleep deprivation and fatigue were at risk of medical (e.g., giving medication at the wrong time), procedural (e.g., entering the wrong dates on paperwork) and transcriptional (e.g., giving the wrong dose of medication) errors. It has also been hypothesized that sleep impairments may lead to poor communication or misunderstandings between nurses and patients or other staff members (Dorrian et al., 2006). This hypothesis is

partially supported by evidence showing that sleep deprivation is associated with increased expression of negative emotion and voice alterations, which may disrupt interpersonal communications (McGlinchey et al., 2011). Sleep problems in nurses may also be associated with public hazard. It is well known that sleep debt due to sleep deprivation or insomnia affects driving abilities in the general population (Léger et al., 2014). Similarly, drowsiness while driving home is frequent in nurses and may increase the risk of car accidents. In 28 days of ecological momentary assessment in 895 nurses, Scott et al. (2007) found that 66.5% reported at least one episode of feeling drowsy on the drive home, with longer shifts (>12 hr) and night shifts increasing the risk of accidents.

#### 4 | PHYSICIANS

Also, physicians sleep less than they might need to on a regular basis (e.g., Bakhru et al., 2019; Coleman et al., 2019), and below the 7–9 hr recommended by the NSF (Hirshkowitz et al., 2015). Sleep problems, such as insomnia and shift work disorder, are common among physicians, with their prevalence estimated at 20% and 8%, respectively (Weaver et al., 2018). Inadequate sleep due to decreased sleep duration, work conditions/shift length, increased sleep fragmentation, decreased sleep efficiency and delayed sleep phase, play a crucial role in physician burnout (Kancherla et al., 2020). Irregular sleep time, sleep deprivation and insomnia are frequent among physicians (Vela-Bueno et al., 2008; Weaver et al., 2018) and have been associated with medical errors and desire to change career (Heponiemi et al., 2009; Weaver et al., 2018). A recent study showed that after a night shift the performance in objective measures of working memory, speed of processing information, perceptual reasoning and cognitive flexibility was significantly poorer compared to after a night of rest in both senior and resident intensivists (Maltese et al., 2016). In physicians, sleep deprivation may result in poorer hand–eye coordination (Taffinder, McManus, Gul, Russell, & Darzi, 1998), prescribing errors (Westbrook, Raban, Walter, & Douglas, 2018), poor physician–nurse communication during night shifts (Al-Qadheeb et al., 2013), poor quality of life (Vincente De Carvalho et al., 2018) and unsolicited patients' complaints (Welle et al., 2020). A recent meta-analysis failed to show significant associations between physician sleep deprivation, patient mortality and postoperative complications (Gates et al., 2018); however, it included only five studies, thus its results should be interpreted with caution. Importantly, emergency physicians may underestimate the impact of sleep-induced impairments. In a recent study, Berastegui, Jaspas, Ghuysen, and Nyssen (2020) measured subjective sleepiness and reaction times in a psychomotor vigilance task at the beginning, middle and end of a 24-hr shift in emergency physicians. The results show an increase of 10% in reaction times at each assessment point, but no significant change in subjective sleepiness across the shift. Physicians' sleep problems may also affect public safety outside the hospital. Ferguson, Shoff, McGowan, and

Huecker (2018) reported that 34% of emergency physicians felt sleepy while driving at least once over a 3-month period.

#### 5 | MEDICAL INTERNS

To fill in the lack of physicians during the COVID-19 outbreak, several states have brought in legislation to enable the recruitment of final-year medical interns into the workforce. Medical interns are commonly exposed to academic and work-related stress, which may exacerbate sleep problems. Often interns receive the implicit message that sleep is something that is dispensable in order to achieve educational excellence (Stewart & Arora, 2019). Inadequate or disturbed sleep is experienced by up to 76% of interns (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017), a percentage that rises to 90% when considering interns carrying out shift work (Jaradat, Lahlouh, & Mustafa, 2020). Sleep problems in medical interns mostly include poor sleep quality (Surani et al., 2015), daytime sleepiness (Alami, Ghanim, & Zyouud, 2018) and insomnia (Kalmbach et al., 2019). A recent study by Morales et al. (2019) found that interns on a 24-hr on-call shift show lower heart rate variability, higher cortisol levels and mood instability across the shift compared to interns on a day shift, reflecting high activation of a physiological stress response. Moreover, in interns, sleep loss has been associated with interpersonal difficulties (Papp et al., 2004), lower quality of life (Belayachi et al., 2013), fatigue, lack of concentration and objective cognitive impairments (Maltese et al., 2016; St Hilaire et al., 2019), whereas insomnia has been linked to the onset of anxiety (Kalmbach et al., 2019) and depression (Tafoya et al., 2019). At the organizational level, the consequences of disturbed sleep in interns include burnout (i.e., lower professional efficacy, higher exhaustion; Jaradat et al., 2020; Wolf & Rosenstock, 2017), impaired ability and motivation to learn (Veasey, Rosen, Barzansky, Rosen, & Owens, 2002), and poor accuracy and efficiency in ECG interpretation (Friedman, Bigger, & Kornfeld, 1971). Also, there is evidence of decreased empathy in their communication with patients during long shifts (Passalacqua & Segrin, 2012). In a recent study, sleeping  $\leq 6$  hr per night and working  $\geq 70$  weekly hours were predictive of frequency of medical errors (Kalmbach, Arnedt, Song, Guille, & Sen, 2017). Outside the hospital, medical interns are exposed to the risk of car accidents while commuting home after a night shift (Johnson et al., 2017). In a longitudinal study in 17,000 USA interns (Barger et al., 2005), working consecutive shifts was associated with increased risk of falling asleep while driving (odds ratio, 2.39; confidence intervals, 2.31 to 2.46).

#### 6 | RETIRED PHYSICIANS

In the COVID-19 outbreak, recently retired physicians have also been called to rejoin the workforce (Mahase, 2020). Prolonged shifts, long surgical sessions, shifts over weekends and night shifts may be particularly deleterious to sleep and stressful for

this population. There is evidence that in older adults stress-induced sleep deprivation alters the hormonal balance (with increased cortisol and thyroid hormones, and abnormal testosterone and insulin-like growth factor-1 levels) and inflammatory response (e.g., increased interleukin-6 release), inducing cognitive impairment and mood dysregulation (Heffner et al., 2012; Maggio et al., 2013). Prospective data show that sleep-wake irregularity and discontinuity are associated with all cause of mortality in the elderly (Wallace et al., 2018). Furthermore, a decreased amount of slow-wave sleep, as is likely to be experienced in emergency care units, is associated with the risk of developing hypertension in the elderly (Fung et al., 2011), even after controlling for respiratory sleep disorders and sleep fragmentation (Javeheri et al., 2018). Similarly, sleep loss and insomnia are associated with myocardial infarction and stroke in older adults (see Patel, Steinberg, & Patel, 2018 for a review). Moreover, insomnia is associated with a higher risk of falls in older women even after controlling for the effects of sleep medications (i.e., benzodiazepines) (Stone, Ensrud, & Ancoli-Israel, 2008).

## 7 | OTHER HOSPITAL STAFF

About 30% of ambulance paramedics suffer from excessive daytime sleepiness and nearly 70% report poor sleep quality (Sofianopoulos, Williams, Archer, & Thompson, 2011). Poor sleep quality in paramedics has been associated with lower emotional empathy in a laboratory paradigm (Guadagni, Cook, Hart, Burles, & Iaria, 2018), higher depression and anxiety symptoms (Khan, Conduit, Kennedy, and Jackson (2020), acute and chronic stress symptoms, obesity and cardiovascular diseases (Hegg-Deloye et al., 2014). Notably, perceived social support was found to buffer the negative effect of occupational stress on sleep quality in an ecological momentary assessment in paramedics (Pow, King, Stephenson, & DeLongis, 2017).

Nursing assistants, who are exposed to physical and emotionally challenging tasks, including helping patients with activities of daily living such as eating and bathing may also be at risk of poor and insufficient sleep. In a recent report, 46% of nursing assistants reported short sleep duration and 23% reported poor sleep quality (Zhang, Punnett, McEnany, & Gore, 2016). Interestingly, poor sleep quality may mediate the effect of work-related stress on assistants' mental health (Zhang, Punnett, & Nannini, 2017).

Cleaning staff may also be exposed to the risk of poor sleep. Previous research has shown that this sector entails extremely tiring and mostly solo work (Akturk & Kavak, 2019). Additionally, salaries, socioeconomic status and job satisfaction are usually low for cleaning staff (Winefield & Jarrett 2011). To the best of our knowledge, direct evidence of sleep problems in hospital cleaning staff is lacking. A notable exception is a cross-sectional study showing that fatigue and dysfunctional sleep hygiene practices are most common among older and female members of the cleaning staff (Akturk & Kavak, 2019).

## 8 | PRACTICAL ADVICE

The previous paragraphs show that hospital staff are habitually sleep deprived and at risk of health consequences of sleep deprivation. Moreover, stress induced by conflicts, natural disasters, etc., is associated with detrimental effects on sleep. Thus, during the COVID outbreak these factors may interact and increase the risk of negative health outcomes in health workers. For these reasons we have included the advice reported below among the educational materials and in the counselling sessions for the management of stress within "Sapienza Cares for the Carers-SC4C", an initiative that provides urgent 24\*7 psychological support to the health professionals in the hospitals of Sapienza University of Rome. The advice should help hospital staff in taking care of their sleep during the COVID-19 outbreak. All hospital staff who are intensively committed in COVID-19 emergency departments (e.g., nurses, physicians, interns, administrative staff, ward clerks, porters, nursing assistants, volunteers, care assistants and cleaning staff) are encouraged to follow and benefit from the advice.

## 9 | DEALING WITH SLEEP DEPRIVATION

- *Naps.* A short nap is better than no sleep. Following sleep deprivation, a 15–30 min nap (interrupted by an alarm or by a colleague) reduces the homeostatic pressure of sleep and improves cognitive and psychomotor functioning. If you are not used to taking naps, do not worry about being able to fall asleep quickly or oversleeping: accumulated wakefulness will increase your propensity to fall asleep and if the nap is short enough, you will be awake before entering slow-wave deep sleep, from which is harder to wake up (due to sleep inertia).
- *Take care to get your necessary continuous sleep.* When possible, allow yourself to sleep continuously for longer than 3–4 hr, which is the amount needed to complete a few non-rapid eye movement (NREM)–REM sleep cycles.
- *Communicate your need for sleep.* Do not hesitate to communicate to your colleagues that you need to take a nap. When possible and needed, sleeping for a few minutes can ameliorate your performance. In addition, this will encourage your colleagues to do the same, at different moments, with benefits for the entire team.
- *Choose and set a sleep-friendly environment.* Although it may be difficult in hospitals, try to maintain your sleep or rest in an environment as comfortable, dark and quiet as possible. Earplugs and an eye mask may help. Also, try to keep that place free from electronic devices.
- *Soak your wrists, hands and face with cold water* when awakening from a nap or a longer sleep. Stimulating a peripheral vasoconstriction will reduce the temporary feeling of sleepiness, disorientation and confusion (due to sleep inertia).
- *Do not counteract sleep.* When you have to stay awake, while sleep deprived and under low-intensity or unchallenging work

commitments, mentally striving to counteract sleep (e.g., telling yourself “I don't have to fall asleep now”) may produce the paradoxical effect of making you fall asleep. On these occasions, if you cannot take a nap, it is preferable to actively engage in arousing activities (e.g., movement, social interactions, light exposure or upbeat music).

- *Be cautious with stimulant use.* When using caffeinated beverages or stimulant drugs, be careful of collateral effects (e.g., consider the duration of the substance's effects that may interfere with the next sleep episode you may be allowed).
- *Be careful if you take sleep medication.* These drugs may have collateral effects that, in combination with sleep deprivation due to overlapping shifts, may increase sleepiness, slow psychomotor responses and affect your circadian rhythm.
- *Take into account your chronotype.* Chronotype is the propensity to have periods of higher and lower performance efficiency throughout 24 hr, which vary across individuals. Some may perform better in the morning, some in the evening, and others may easily adjust to both morning/evening work. Be aware that the effects of sleepiness due to overlapping shifts and sleep deprivation are higher in your periods of lower performance efficiency.
- *Work with a colleague.* During night shifts, or when sleepiness is high and you have to stay awake, try to work with at least one colleague. This will help sustain vigilance and handle the effects of sleep deprivation, thereby reducing job errors and sudden-onset sleep. When possible, choose well-lit rooms, listen to upbeat music to increase your arousal, have conversations with colleagues and brief calls to friends and family, as social interactions increase arousal.
- *After a long vigil at work,* if you feel sleepy and have to drive a long way back home, don't drink coffee but consider taking a short 10–20 min nap.

## 10 | ENSURE YOUR SLEEP QUALITY DURING DAYS OFF

### 10.1 | Sleeping at home during a day off

- *Maintain your sleep routine.* The maintenance of a pre-sleep routine and regular sleep schedule will inform your mind and body that it is time to relax and sleep. Your body will learn that these periods and pre-bed activities (drink an infusion, listen to calm music, read a book and brush the teeth) precede the physiological de-arousal that will facilitate sleep. Avoid arousing activities such as a workout, tidying up, working, thinking about work or checking COVID-19-related news.
- *Set regular time to wake up and to go to bed,* when you don't have a shift schedule.
- *Go to sleep when you feel sleepy.* You can't force yourself to sleep. Even when you have a short time to sleep, don't force yourself or

worry about not sleeping enough. Paradoxically, this can keep you awake.

- *Avoid intense or blue light and electronic devices.* To facilitate your sleep onset, avoid exposure to sources of intense light or blue light, such as that coming from electronic devices. These will inhibit the release of sleep-inducing hormones such as melatonin.
- *Keep your sleep environment as comfortable as possible.* To facilitate your sleep, the sleep environment should be dark, quiet and at around 20°C degrees. Also, consider the use of an eye mask and earplugs.
- *Create your safe mental island.* If stress and pre-sleep worries impact your sleep, create your own safe mental island composed of your relaxing memories, fantasies and dreams, which may facilitate falling asleep. Well before going to bed make a short list with elements to enrich your mental island.
- *The 15-min rule.* When you are not able to fall asleep in a reasonable time (15–20 min), get out of bed. Moving to another place (e.g., sofa or chair) is better than staying in bed striving to sleep. Distract yourself with a relaxing activity and go back to bed only when you feel sleepy again. Get of bed–relax–distract is efficacious for treating sleep-onset insomnia and night-time long awakenings.

### 10.2 | During the day, before and after the shift

- *Expose yourself to light.* Right before and during the first part of the shift, expose yourself to natural or artificial but intense light for 30 min (even discontinuously). This will increase your vigilance and reduce sleepiness at work.
- *Avoid naps 5–6 hr before longer sleep.* If you set an appropriate time to get continuous sleep, avoid naps in the 5–6 hr prior to sleep. If extremely needed, naps on these occasions should not last more than 20–30 min.
- *Avoid alcohol prior to sleep.* After an initial de-arousing effect of alcohol, there will be a rebound effect that will reduce the amount of restorative sleep and increase night-time awakenings. Moreover, alcohol interferes with the release of antidiuretic hormone and worsens snoring, sleep apnea and other pre-existing sleep problems.
- *Avoid stimulants 5–6 hr prior to sleep.* Beverages containing caffeine or theine should be avoided 5 to 6 hr prior to sleep.
- *Avoid smoking or other nicotine use 30 min prior to sleep.* Nicotine will worsen your sleep and abstinence can cause night-time awakenings. Quitting smoking may be hard in this period, due to an increase of restlessness during both the day and night. However, this can be a good moment to reduce smoking.
- *Mind your diet.* Eating too much or eating too many sugars may worsen your sleep. After an initial deactivation, your metabolism will be greatly activated and this may affect your sleep. Avoid drinking too much liquid before sleep; this can increase your awakenings.

## 11 | DEALING WITH NIGHT SHIFTS

### 11.1 | Before and during a night shift

- **Nap.** Consider taking a long nap before the shift (e.g., 90 min). This will reduce sleepiness during the night.
- **Eat.** Have your main meal before the shift, at supper time. You might also consume 150–200 mg of caffeine (one small cup of coffee) within the first 2 hr of the shift to improve your vigilance and performance.
- **Exposure to light.** If possible, expose yourself to intense light in the first hours of the night shift, but avoid exposure after 04.00–05.00 hours.
- **To deal with sleepiness** during the night shift, consider the advice on “deal with sleep deprivation” (e.g., work with a colleague, soak yourself with cold water, etc.).

### 11.2 | After a night shift

- **Avoid direct exposure to sunlight.** You may use sunglasses on the way to home.
- **Have a light snack before going to sleep.** This will avoid waking up due to hunger. Avoid a large meal before going to sleep as it might cause you sleep difficulties.
- **Set your sleep environment** to be as dark as possible and create your pre-bed relaxing routines as indicated in the previous section.
- **Set your alarm.** Maintain a regular wake time, setting your alarm at a fixed time (e.g., 15:00 hours), and expose yourself to sunlight right after awakening.
- **Consider the 15-min rule.** If you experience difficulties falling asleep or maintaining sleep, the 15-min rule might be helpful.
- **On days off.** If you have days off between night shifts (e.g., three night shifts, three days off, three night shifts, etc.), consider setting your sleep times at an intermediate point during the days off. For instance, going to sleep at 3 a.m. and waking up at 12 p.m. may help your body to adjust better to different shifts.

### CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

### AUTHOR CONTRIBUTIONS

CL, FL and CV set the practical advice, and discussed and revised the manuscript. AB drafted the paper and contributed to the practical advice.

### ORCID

Andrea Ballezio  <https://orcid.org/0000-0001-6402-6179>

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