

ADDRESSING SLEEP NEEDS DURING THE COVID-19 OUTBREAK AND BEYOND

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sleeprate

RECLAIM YOUR SLEEP

BACKGROUND

The ongoing global crisis caused by the CoVID19 pandemic caught the world by surprise and unprepared. There were some who tried to warn the world of potential threats, a respiratory virus spreading out rapidly in a world with no borders for intruders of this kind. Yet in vain. And now the tsunami is here. We are taking the hit, yet we will resurface and thrive.

For several weeks already people in different countries all over the world are living under many restrictions, different degrees of lockdown, all in an otherwise unplanned attempt to slowdown the spread of the new virus and to save lives. While the forced social distancing helps protecting ourselves, our loved ones and our fellow citizens, the burden created is unprecedented and the price is skyrocketing, at both the individual and the societal levels.

The continuous stream of information regarding numbers of diagnosed people, those in critical condition, those dying every day triggers an endless fear of losing our loved ones, fear of getting the disease, fear of death. The home confinement breaks our daily routines and our social relationships and needs. Some may continue working from home, but some are not so lucky, and they lose their jobs. It is only natural that spending time at home under such circumstances brings in loneliness and distress, raises anxiety, and interferes with daily rhythms and with sleep.

At the societal level: healthcare systems are overwhelmed, unemployment is already here and growing, economies are slowing down, and governments are trying to prevent a bad recession while fighting to contain the pandemic.

Clearly the key to dealing with the crisis is to be able to control the pandemic, to have a clear picture of the spread of the virus generated by extensive testing for active infection and for population immunity, to have a vaccine and/or an efficient treatment for the new virus. Reaching all these objectives is going to take some time, and meanwhile the world needs to navigate the stormy waters. Not easy at all at the individual, geopolitical and societal levels.

The ongoing turmoil leads to increased stress, anxiety, poor eating, an increase in sedentary life. All those damage sleep. Poor and insufficient sleep in their turn have a negative impact on our immunity, increasing the risk for infection, Corona virus disease included.

The relatively young evidence-based sleep medicine gradually rediscovers how true old wisdom and our grandmothers' advice are: sleep on it to get ready for your next exam, you will grow while you sleep, or when being sick with fever or a cold --- sleep and you will feel better when you wake up in the morning.

WHAT IS HAPPENING NOW IN SO MANY PLACES OVER THE GLOBE

The lockdown interrupted all daily routines. Work schedule is wrecked as people are forced to work from home, or, even worse, loose their job. Children are home too, as schools are closed. A couple of days maybe fun, yet the situation is ongoing and has negative impact on the ability to sleep, as the internal clock and the external triggers get out of sync. Add to this that we may spend more time in bed and our sleep drive may decrease, and we get in trouble regarding our slumber.

The fear to get sick or to lose somebody loved to the Corona disease, grief over a parent or a friend who succumbed, the forced loneliness due to the mandatory social distancing, job and financial insecurity, all lead to stress and anxiety, which in turn have a direct effect on our health and feed our inability to get the good sleep we need more than ever. Now the process is self-sustained, with sleep loss causing increased stress and mood issues that further impact sleep...

The endless influx of contradicting information and data, and sometimes fake news, is a very potent enhancer of stress and anxiety and a well-known sleep thief.

Adding a forced sedentary life, a not so healthy nutrition, caffeine and alcohol consumption, smoking; this is a dreaded formula that makes quality sleep impossible even for those who never experienced sleep or mood issues. The problem is even bigger for those who have already experienced sleep issues, anxiety or depression in their past.

Our defense system is less efficient, unless we can break the vicious circle. The lockdown makes regular access to direct, face-to-face care almost impossible for conditions unrelated to the Corona disease or other emergencies. [The digital technology](#) can help solving the problem by allowing for virtual encounters with physicians and therapists. Thus, [telemedicine becomes a useful option](#), and in many instances the only available one.

A FEW FACTS ABOUT SLEEP

A short list of facts about sleep that are more relevant than ever during the COVID-19 pandemic with its impact on all aspects of our lives. For reference, here is how those relate to what grandma used to tell us tenderly:

- *“Sleep on it, have a clear mind when you wake up!”* Sleep loss and poor sleep make us more vulnerable to stress, depression and anxiety. That is because during sleep emotions are processed helping to forget what needs to be forgotten, and to remember what needs to be remembered, for us to function well and to keep a stable mood with good mental health.
- *“Cool down before you go to bed and sleep like a baby!”* The opposite holds too: stress and anxiety make it difficult for us to fall asleep and damage the quality of our sleep.

- *“If you do not sleep well, you will get sick!”* Or, *“sleep and you will feel better in the morning!”* Indeed, research proved lately that sleep loss increases the predisposition to catch a common cold. There is evidence that developing immunity after a vaccine is negatively influenced by getting a less than normal recommended amount of sleep. Recovery is also directly related to sleep, as research shows that an increased amount of Non-REM sleep is related to a faster regain of good health. When digging deeper into the processes that help fighting diseases, the accumulating knowledge base indicates that inflammation factors flare up, and immune factors are downgraded as a direct result of poor or insufficient sleep.

INITIAL EVALUATION OF THE INFLUENCE OF THE ONGOING CORONA PANDEMIC ON POPULATION’S SLEEP

Methods

Study design: observational study included all users who downloaded the Sleeprate app and completed an initial sleep concerns survey.

Data analysis for two time periods: 45 days during the ongoing Corona outbreak versus same period last year:

Corona outbreak = **P2**: March 1st -- April 15th, 2020

Corresponding time last year = **P1**: March 1st -- April 15th, 2019

Results

Demographics:

Time period	March1--April 15, 2019 P1	March 1--April 15, 2020 P2
Age in years (Mean/SD)	34.8 (12.8)	34.9 (13.3)
Gender (percentage male) **	56%	54%%
BMI (Mean/SD)	26.3 (9.6)	26.4(7.0)
Number of users **	1414	849
Average number of nights/user *	11.2	9.5
Average of nights with device/user *	7.7	5.4

Users included did not differ in age and BMI; however, there were more men than women in both groups, and the percentage of men decreased by 2% from the previous years’ time of interest.

Sleep related concerns

The survey is used since 2014 in the [Sleeprate monitoring app](#), and it is mandatory for all those who start using the app to monitor or to improve their sleep. The survey includes 7 questions with yes/no as possible answers, see Table 2 and Figure 1.

Table 1: Sleeprate app sleep concerns survey results

Survey question	% answered yes in P1	% answered yes in P2	% yes in P2 - % yes in P1
Do you have trouble falling asleep at night?	44.13	48.99	4.86
Do you wake up at night and have trouble falling back asleep?	45.05	47.23	2.18
Do you wake up too early in the morning and can't fall back asleep?	38.68	39.81	1.12
Do you feel unrested in the morning?	78.29	79.86	1.57
Do you feel sleepy during the day?	72.98	73.26	0.28
Do you have difficulty getting up and starting the day in the morning?	68.81	69.02	2.33
Are you told that you snore?	50.71	49.82	-0.88

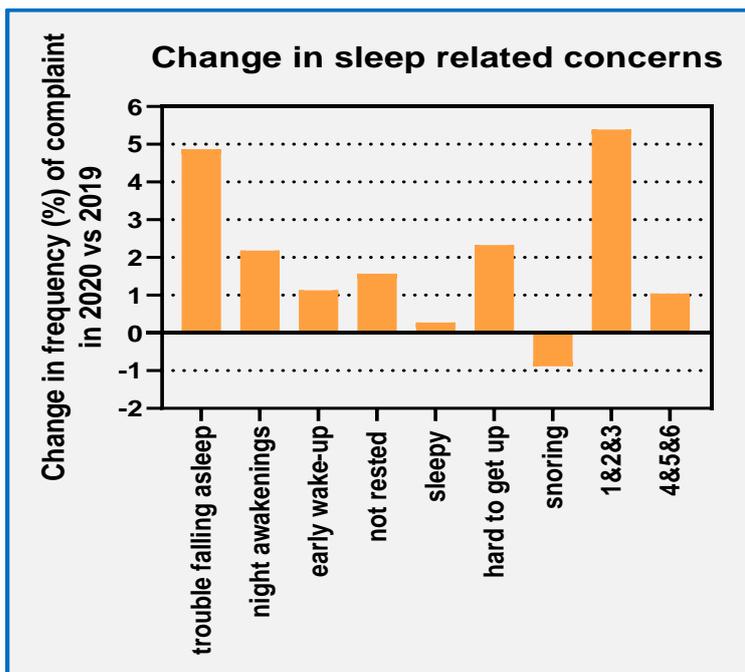


Figure 1: Changes in sleep concerns in the March 1st-April 15th, 2020 period, during the COVID-19 outbreak. There is a clear increase in the percentage of people who have difficulties falling asleep, maintaining sleep during the night, or waking up earlier than intended.

5.4% more users answered yes to at least one of the questions regarding sleep difficulties that may represent insomnia symptoms.

Sleep timing

Bedtime and wake-up time are reported in real time within the app, thus providing a rather accurate and reliable digital sleep diary, see Figure 2. Users went to bed on average at 11:14 pm in P1 and at 11:43 pm in P2, meaning 29 min later during the Corona outbreak; they woke up at 7:05 am on average in per 1 and at 7:42 am in per 2, meaning 37 min later during the Corona outbreak. Results suggest that the difference in the wake-up time during the outbreak was larger than that in the bedtime, providing an opportunity to extend sleep.

Perceived sleep duration and nightly reported sleep opportunity

Users spent in bed **on average 477.5 minutes during P2** and **on average 467 minutes during P1**, meaning a nightly sleep opportunity **longer by 10.5 minute during the Corona outbreak**, see Figure 3.

Users took on average longer to fall asleep during the Corona outbreak compared to the same period during the previous year: 24 minutes versus 21 minutes, respectively; however, the difference did not reach statistical significance ($p = 0.082$, unpaired, two-tailed t test).

No difference in the perceived time spent awake at night: 24 minutes during the outbreak versus 23 minutes on average same period last year.

The **sleep duration** estimated based on the perceived falling asleep time and time spent awake at night was on average 430 min during P2, as compared with an average of 423 minutes during P1, meaning users sleep about 7 minutes longer during the Corona outbreak than during the same period the previous year.

No significant change was observed in the subjective sleep efficiency, on average 90% during both periods.

Objective sleep variables

Sleep duration increased to 410 minutes on average during the outbreak from **404 minutes during the previous year**, yet the difference did not reach statistical significance. No significant change in the **objective sleep efficiency was observed: it remained 86%** on average.

Morning reported sleep satisfaction and daytime reported stress and sleepiness

No significant change in the morning reported sleep satisfaction (on a Likert scale of 1--10): 5.6 during the outbreak versus 5.5 during same period the previous year.

Sleepiness (daytime sleepiness on a Likert scale of 1--10): 3.0 during the outbreak versus 2.9 a year before, indicating no significant change.

Daytime reported stress (on a Likert scale of 1--10): 2.4 during the outbreak versus 2.2 the previous year, with no statistical significance.

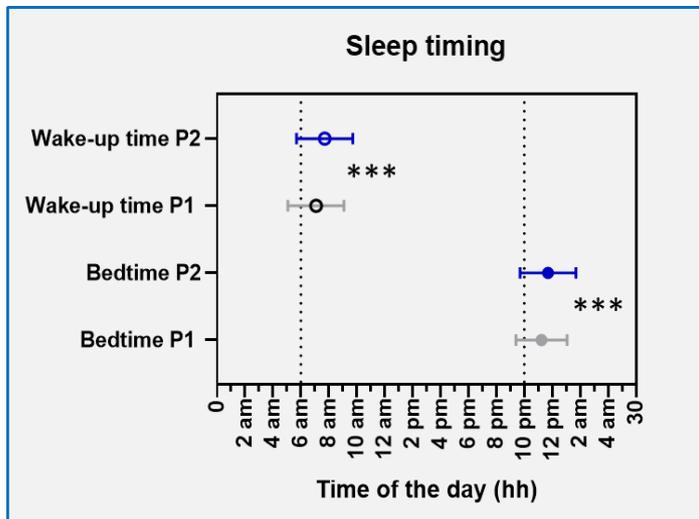


Figure 2: Shows bedtime and wake-up time during P1 and P2 and indicates later bedtimes and later wake-up times during the COVID-19 outbreak in the period March 1st--April 15th, 2020, compared to the corresponding period in 2019. Note: *** indicates significant difference for unpaired, two-tailed t test with $P < 0.0001$.

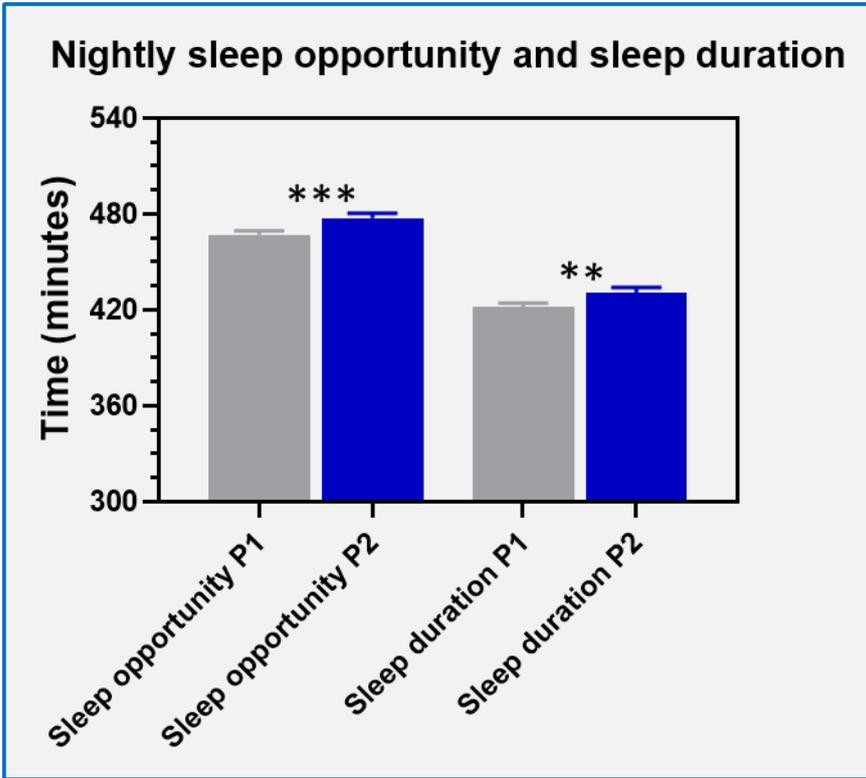


Figure 3: Shows sleep opportunity and sleep duration during the COVID-19 outbreak (P2) and the corresponding time period (P1) in 2019. Note: ** for $p=0.0455$, unpaired, two-tailed t test; and *** for $p=0.0075$, unpaired, two-tailed t test.

Conclusion and Discussion

The lifestyle changes related to the ongoing pandemic, the fear while facing a new viral disease that spreads rapidly while there are limitations for testing for the disease, there is no vaccine or efficient drug therapy yet, and the lives of many is threatened, are expected to cause stress and damage sleep.

Add to that the financial insecurity that escalates the anxiety, and sleep problems may become a real problem.

Our initial evaluation indicates that in a relatively young population sleep opportunity increases, as expected when people are confined in their homes. Sleep duration seems to increase by a modest 7 nightly minutes on average. Although the average sleep latency (falling asleep time) also increased, the average sleep efficiency remains normal. Same is true regarding sleep satisfaction, which remains above 5.5, indicating that people are rather satisfied with their sleep when they wake up in the morning. Thus, a digital sleep diary in young population of predominantly men does not suggest that a very significant sleep problem develops, as average sleep latency, sleep efficiency and sleep satisfaction remain within normal range.

There is also a slight increase in sleep opportunity, as expected, and in sleep duration.

In spite of those encouraging results, the sleep related concerns show an increase in the percentage of people complaining of difficulties falling asleep, sleeping soundly throughout the night, and waking up refreshed. This may be explained by the fact that the evaluation started with looking into sleep variables averages in the observed population.

Attention should be devoted to those who have sleep-related concerns and may have also sleep difficulties. As data accumulate, a deeper understanding of the problems may be obtained by addressing specific populations with individual and occupational risk factors for sleep problems. Preventing sleep deterioration in many, as the crisis continues and as the consequences of the outbreak become apparent, maybe possible.

The availability of a [self-help digital solution](#) to evaluate sleep difficulties and to provide efficient behavioral interventions and stress reduction aids should be considered. The scarcity of conventional sleep therapy solutions becomes more significant during the ongoing social, healthcare and economic turmoil caused by the COVID-19 outbreak.

SLEEPRATE'S MODEST CONTRIBUTION TO HELP YOU NAVIGATE TO SAFE SHORES

If professional help is unavailable, or if the problems are not severe, simple measures such as creating a regular daily routine, planning healthy meals, implementing some simple fitness exercises, practicing relaxation or meditation or yoga, can help.

Easier said than done. There are self-help digital solutions out there. Mobile applications for healthy nutrition, fitness, relaxation, sleep, digital books, movie streaming... So many choices! Some of them should work for many, to ease the burden of the ongoing crisis.

Sleeprate provides a sleep solution with demonstrated efficacy in improving sleep. It is rooted in the gold-standard principles of Cognitive Behavioral Therapy for Insomnia (CBTI). And, importantly, it is personalized, based on individual data and intelligent algorithms.

Sleeprate has helped many people sleep better, falling asleep faster, sleeping soundly at night, waking up refreshed, and getting more healthy days.

During these very difficult times, when we need good sleep more than ever, while sleep is challenged in so many ways and access to regular care is limited, we [at Sleeprate feel that it is our mission and duty to offer you](#) a tool that will support you get safely through the Corona caused crisis.

