

Sleep Disorders in Uruguay during the COVID-19 Pandemic

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Received: July 01, 2021 Published: July 20, 2021

Abstract

Aim: The COVID-19 pandemic in Uruguay prompted Public Health authorities' recommendation for voluntary confinement at home beginning in March 2020. Sleep disorders tend to worsen in populations affected by acute stress due to catastrophic events.

Study Objective: To assess changes in sleeping habits and sleep disorders in the first two months of voluntary confinement during COVID-19 pandemic in Uruguay.

Methods: This is a cross-sectional study of subjects above the age of 6 who were in confinement. They completed an online survey distributed throughout a web-based platform. Sleep schedules, napping, sleep quality and presence of sleep disorders (insomnia, parasomnias, snoring and movement disorders) were reported. We statistically compared the sleep data of this population, both prior and during the COVID 19's pandemic confinement.

Results: 1009 people were evaluated, 75% were women and 25% were men. Mean age was 41 years (6 - 83 years). During confinement, the subject's bedtime was delayed by 1 hour and 20 minutes, and people got up later in the mornings. Total sleep time was prolonged 20 minutes, but the reported sleep quality worsened significantly. Most adults reported taking naps during confinement. Sleep disorders such as Insomnia and nightmares increased significantly ($p \leq 0.005$). 12% of adults who denied consuming medication before the lockdown, referred the need of hypnotics and anxiolytics in order to have a restful sleep.

Conclusions: We confirmed changes in sleep habits, significant deterioration in sleep quality, an increase in, insomnia, parasomnias and in the number of daily naps, as well as increased use of hypnotics and anxiolytics as a consequence of stress and confinement during the first months of COVID 19 pandemic in Uruguay.

Keywords: Sleep, Insomnia, Parasomnia, COVID 19, Pandemic, Confinement, Uruguay

Introduction

As a result of the SARS Cov-2 (COVID-19) pandemic, the Uruguayan Public Health Authorities declared a state of health emergency with the aim of protecting the population by preventing the spread of the disease. In March 2020, several measures were introduced, such as national border closure and strategies to avoid public congregations. Additional recommendations included the closure of parks and recreational areas, non-essential workplaces, public places and bars and restaurants, along with restrictions on gatherings. Voluntary social distancing was strongly suggested, and concurrently abided by the population. This unprecedented situation increased stress levels. People worried not only about the disease itself, but also about other health issues that might not be optimally addressed, financial and work issues, and other psychological and interpersonal stressors. Prior research has shown that worries and anxieties tend to have a negative impact on sleep. Intrusive thoughts increase the difficulty to fall asleep initially or return to sleep if awakened in the middle of the night.

Published studies and surveys have already suggested that insomnia, sleepiness and fatigue have increased during COVID-19 pandemic in different settings and in different countries. Quarantine and social distancing of a population potentially exposed to a contagious disease leads to deleterious psychological effects, including post-traumatic stress symptoms, confusion and anger.(1) The development of these conditions may also disrupt the quality of sleep/sleep patterns (2)

In the intent of further studying this subject, it is vital to state the crucial role of sleeping in human physiology. Actually, one third of human life is spent sleeping, underscoring the vital importance of a biological function that has been maintained in all species throughout evolution. Sleep contributes to body homeostasis especially of the central nervous system but also of endocrine, cardiovascular and digestive systems. Sleep is a basic requirement for brain and body development of children and adolescents. Decreased sleep time negatively affects intellectual performance, work productivity, social and interpersonal relationships, as well as quality of life. There is an increased risk of obesity, diabetes, hypertension, stroke and depression in those with insufficient sleep. (5) Over the past 15 years, research in neuroimmunology has collected conclusive evidence to confirm that sleep improves immune system functions.

More specifically, Non-REM Sleep (slow-wave sleep), occurring mainly in the first half of the night, benefits changes in cytokine secretion supporting long-term immune memory function. As it also favors the consolidation of cognitive memory, some authors have proposed the function of sleep as an adaptive strategy to potentially challenging environmental events.

This worldwide pandemic and its prolonged confinement in many countries are unique in terms of its potential impact on sleep and circadian rhythms. To document its changes will hopefully help to develop new approaches to improve sleep under catastrophic circumstances.

2. Objectives

This study was developed with the objective of collecting the following information on the effects of the confinement during COVID-19 pandemic:

1. To determine the usual sleep rhythms in the surveyed population: sleeping and waking times, napping and self-evaluation of sleep quality.
2. To describe sleep rhythms and disorders during the time spent in confinement.
3. To analyze differences between both situations.

3. Methods

3.1 Study Design

This is a cross-sectional, observational, descriptive study involving people who defined themselves as being in total or partial confinement. It took place during May 2020, two months after the voluntary lockdown was implemented in Uruguay. An online survey was used from the Google Forms platform, by means of a link shared through online social media.

Participants' inclusion criteria were age above 6 years old and living in partial or total home confinement. The exclusion criteria was not being self isolated.

Anonymity was guaranteed and an informed consent explaining the objectives of the study preceded the questions of the survey. The study was approved by the Hospital Maciel's Ethics Committee.

3.2 Instrument

A short form questionnaire was considered suitable for this research, adopting standardized and widely used tools commonly applied for the study of sleep-related medicine.

The questionnaire was structured in twenty one questions with multiple choice answers. Sociodemographic variables collected were gender, age, profession, education, current work in healthcare facilities, and days spent in quarantine.

Chronobiologic sleep patterns included bed and waking times previous and during COVID's pandemic. In order to avoid memory biases, we asked for information about sleep habits in the month previous to quarantine.

Data covering sleep disorders were as follows:

1. Symptoms of insomnia: prolonged sleep latencies; increased number of awakenings; waking up in the middle of the night feeling unable to resume sleep.
2. REM Parasomnias: increased episodes of nightmares. Content of dreams related to COVID's pandemic (i.e. being ill or having family and friends affected by the disease).

3. Other sleep disorders: snoring, sleep apneas witnessed by family members, No REM parasomnias (somnambulism and sleep terrors), leg discomfort with circadian rhythm before sleeping.
4. Consumption of prescribed drugs not needed before the pandemic, such as hypnotics, anxiolytics, antidepressants and / or other psychotropic drugs.
5. Perceived sleep quality before and during pandemic was assessed by a Likert's scale from 1 (very unsatisfied) to 5 (very satisfied).
6. Napping at least 2 times per week before and during pandemic.

The online survey was distributed on social web platforms and took about 10 to 15 min to complete.

3.3 Statistical Analysis

The data collected from the Google Forms were exported to the Statistical Package for the Social Sciences (SPSS) in the 13.0 version, allowing statistical analysis in line with the objectives of this study.

For quantitative variables, descriptive measures were obtained, such as minimum, median, mean, standard deviation (SD) and maximum. We performed a chi-square test to verify association between variables of interest. A value of $p \leq 0.05$ was considered statistically significant.

4. Results

4.1 Sociodemographic data

This study involved the participation of 1207 people who completed and returned the questionnaire. Of this initial sample, 1009 subjects declared to be in quarantine, whose data were analyzed.

The majority of respondents were female (758 people, 75.1%).

The average age was 41 years, and the age group distribution was 6 - 12 (0,6%), 13 -20 (5,3%), 21- 50 (62,5 %), 51-70 (29,3%), and older than 70 years (2.3 %). The average time spent in quarantine was 43 days.

Confined participants working in Health Care accounted for 24% of the sample (244 subjects). This category included Medical Doctors, Nurses and other health care related workers.

	Subjects	Percentages %
Health Care workers	244	24.1
Students	148	14.7
Other Professionals	268	26.6
Other activities	241	23.9
Retired	97	9.6
No activity	11	1.1

4.2 Chronobiology of Sleep Patterns

The data analysis found evidence of a sleep phase delay during the pandemic. In average, bed time in both genders was significantly prolonged by 1 hour and 19 minutes ($p \leq 0.05$). While the waking time was also lengthened in both genders, the results showed women to have their waking time significantly later than men. (Tables 1 and 2)

	Bedtime Pre Q	Bedtime during Q	Difference
Women	11.45 PM	01:10 AM	1 hr 20 min *
Men	12:04 AM	01:08 AM	1 hr 04 min *
All	11:50 PM	01:09 AM	1 hr 19 min *

Table 1. Bedtimes changes during Quarantine compared with Pre Quarantine.

	Waking Pre Q	Waking in Q	Difference
Women	07:35 AM	09:21 AM	1 hr 26 min *
Men	07:39 AM	08:06 AM	27 min *
All	07:34 AM	09:17 AM	1 hr 16 min *

Table 2. Wake up changes during Quarantine compared with Pre Quarantine.

Pre Q = Pre Quarantine

In Q = During Quarantine

* $\leq 0,005$

All subjects slept 20 minutes longer on average during the quarantine period

Sleep Time Pre Q	Sleep Time in Q	Average Difference
07 h 46 m	08 h 08 m	20 m*

Table 3 - Sleep time relation to Quarantine

A significant difference in sleep delay was found amongst the age groups. Younger subjects went to bed much later than older subjects, compared with sleep habits before the lockdown. (Table 4)

Age (years)	Bedtime Pre Q	Waking Pre Q	Sleep Time Pre Q	Bedtime	Waking	Sleep Time
				In Q	In Q	In Q
6 -20	11.04 PM	07.07 AM	08 h 03m	01.08 AM	09 h 30 m	08 h 22m
21 -50	11.52 PM	07.38 AM	07 h 46 m	01.27 AM	09 h 43 m	08 h 16 m
51- 70	11.46 PM	08.28 AM	07 h 42 m	12.32 AM	08 h 34 m	08 h 02m
≥ 71	12.03 AM	08.05 AM	08 h 02 m	12.34 AM	09h 00 m	08 h 26 m

Table 4 - Bedtime and Wake up times according to age and Quarantine status

The findings of the questionnaire reported a rise in napping at least twice a week during the lockdown period.

Napping	Yes	No
Pre Quarantine	29.90 %	71.10 %
During Quarantine	36.20 %	63.80 %

Table 5 - Naps during Quarantine

4.3 - Sleep Quality

During quarantine 18,40% (Likert 1+2) of the population complained of a low sleep quality, compared to the 3 % reported before this period. While 20,6% of the population declared to be very satisfied with their sleep before quarantine, only half of them (10,3%) expressed the same satisfaction with sleep during the lockdown (Likert 5) (Figure 1).

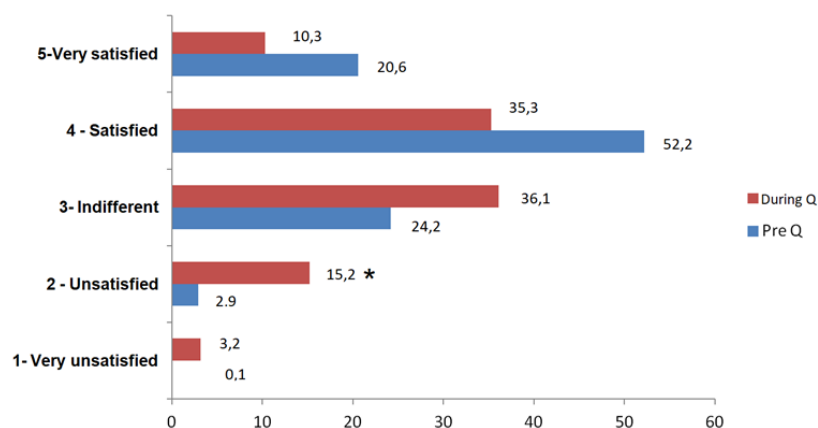


Figure 1 - Comparison of Sleep Quality Pre and During Quarantine. Values are expressed in percentage of total population Pre Q = Pre Quarantine During Q = During Quarantine

4.4 - Sleep Disorders

Self evaluated sleep disorders had an important rise during quarantine (Table 6). While 32 % declared to have suffered from some sleep disturbances before quarantine, the number of people affected significantly increased to 42,3 % during quarantine.

	Pre Quarantine	During Quarantine
With Sleep Disorders	32.7 %	42.3 % *
No Sleep Disorders	67.3%	57.7 %

Table 6 - Sleep Disorders increased during Quarantine

* p ≤ 0,005

Insomnia and nightmares were significantly the most frequently reported symptoms, accounting for 27,2% and 28,7% respectively of declared sleep disorders. (Figure 2) Nightmares' contents were not specially related to illness or the pandemic. There was no evidence of a significant difference in No REM parasomnias and snoring during this period.

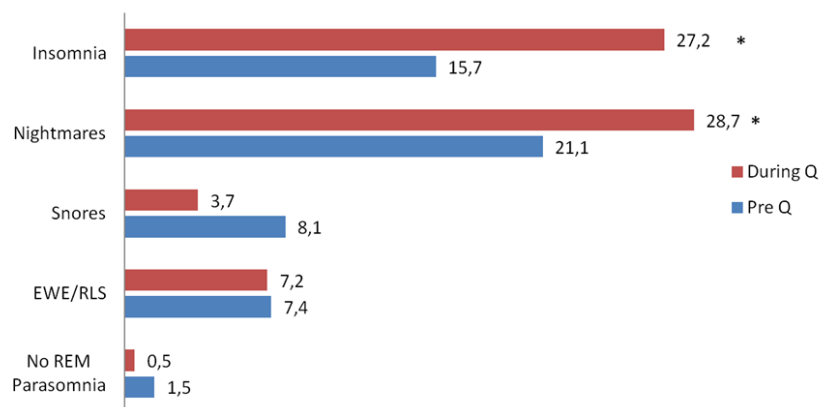


Figure 2 - Comparison of Sleep Disorders Pre and During Quarantine. Values are expressed in percentage

4.5 - Use of Medication

12% of the population consumed medications that they did not use before the quarantine. The most frequently prescribed drugs were anxiolytics (more frequent benzodiazepines), and hypnotics. (Figure 3)

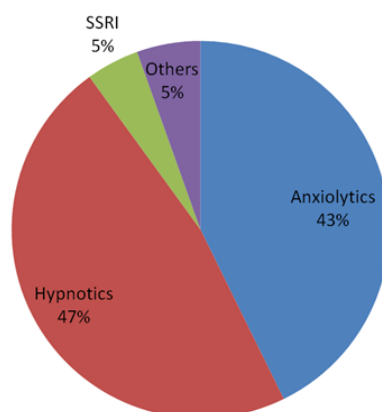


Figure 3 - Use of medication during the quarantine period.

5. Discussion

The uncertainties associated with the COVID-19 pandemic, and its potential outcomes, have exposed most people to unprecedented anxiety and stress that affects sleep. Historically, quarantine has been related to irritability, somatic disorder, and insomnia. Moreover, a high level of stress and trauma-related disorders are byproducts of being isolated. Accordingly, studies conducted in China on the effect of the COVID19 diffusion on psychological dimensions and well-being highlighted similar results [1].

To our knowledge, this is the first study confirming that sleep is significantly disturbed in the Uruguayan population during the COVID-19 outbreak. Overall these findings are in line with what other studies reported [3, 4, 5, 7], revealing alterations of sleep patterns and disorders in the context of COVID's pandemic. Moreover, our study compares the previous situation regarding sleep habits and disorders using the same population as controls, which enhances the validity of results.

Sleeping on one's natural rhythm is an option when work and learning demands are dissociated from time of day constraints. This population shows a remarkable social jet lag, especially in teenagers and young adults, who changed their bedtime and waking patterns with a phase delay of about one hour. This disorder may be detrimental to the overall health, as normal circadian rhythmicity plays a vital role in immune system optimization. Consequently, desynchrony of the circadian rhythm and its effects on the immune system may lead to increased susceptibility to infections.

Besides, the overuse of electronic devices in the hours pre sleep was a strong habit in our society already before the pandemic emergency, particularly amongst young people. Various studies have identified a strong correlation between screen habits and the time course of sleep disturbances.

Even though people declared to sleep a bit more during the lockdown than during normal previous life, this small amount did not produce benefits on sleep's wellbeing perception. The findings of this study show a significant dissatisfaction with sleep quality, rising up to 18,4 % compared to 3 % before the lockdown, and a decrease of the number of people that referred to have a satisfying sleep before the COVID 19. This situation could be attributed to lack of opportunity for physical activity, fear of financial instability, and staying at home without brain stimulating activities (such as employment) or attending kids full time.

Napping showed a marked increase in frequency revealing the lack of tight schedules in the confined population. Easing the sleep propensity of homeostatic Process S while napping, could also contribute to the sleep phase delay.

Regarding sleep disorders, the data shows that 42% of people were affected during the confinement period, according to their self evaluation. Insomnia, proved to be the most common sleep disorder according to other studies, increased significantly to 27,2 %, coincident with the reported unsatisfactory sleep quality. Earlier observations of Mellman and Hipolito [5] indicated that insomnia and nightmares are prominent following trauma. These previous statements are consistent with what has been found in our sample, where 28% of the population referred to have experienced more nightmares during the pandemic.

The consumption of benzodiazepines and hypnotics showed to be significantly increased in this study. This fact supports the notion of general distress and the search for relief and a better quality of life.

This work was based on a short survey with the aim of being efficiently and easily completed. However, this method of analysis has a number of limitations. Some useful scales such as Pittsburgh Sleep Index and Epworth Sleepiness Scale were not fully used in the questionnaire. Selection bias is another potential concern, because the healthcare workers are overrepresented in our sample.

6. Conclusions

Sleep is essential for maintaining an organism's homeostasis, psychological balance and a good quality of life. Our research concludes that significant changes in chronobiology and an increase in sleep disorders took place during the COVID 19 pandemic in Uruguay. The impairments caused by sleep debt could potentially trigger alterations of the immune system and mental health.

Taken together, these findings highlight the vital role of sleep, and the many negative implications of its irregularity. We hope that our research will serve as a base for more studies and better health policies. Future work should target the need for improving sleep health, by focusing on recognizing and treating its disorders.

Acknowledgements

The authors wish to thank all the people who participated.

Conflict of Interest

This study did not have any economical incentive. The authors do not have any conflict of interest to declare.

Author Contribution

Each author has contributed significantly to this manuscript as described in methods including outlining the paper, drafting, writing and editing.

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Citation: Cecilia O, Marcela L, Alicia V, Lucía D. "Sleep Disorders in Uruguay during the COVID-19 Pandemic". *SVOA Neurology* 2:4 (2021) Pages 109-116.

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