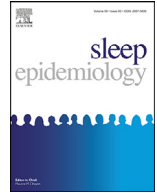




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Changes in lifestyle during the COVID-19 lockdown in Brazil: Impact on sleep quality

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ARTICLE INFO

Keywords:

Pandemic
Sleep hygiene
Exercise
Food habit

ABSTRACT

This study examined the influence of lifestyle changes made during the COVID-19 lockdown on sleep quality in a Brazilian population. We conducted an online cross-sectional study with 589 Brazilians that completed an online questionnaire about sociodemographic variables (age/status/cohabitation/education), general habits (exercise/work), and sleep quality (Mini Sleep Questionnaire). Poisson regression (log-linear) was used to examine sleep quality risk factors. 41.93% of the population reported impaired sleep quality during lockdown. Increased alcohol consumption, worsened diet quality, and use of bed for work during lockdown were risk factors for worsening sleep quality. Increased or beginning physical activity during lockdown was protective against poor sleep quality, as was male sex. Our results suggest that habit change during COVID-19 affected sleep quality in a general Brazilian population. However, it is important to be aware of whether these positive/negative habits acquired during the interdiction persist after the pandemic.

Introduction

Environmental factors besides stress and anxiety likely contributed to the increase in sleep complaints during the COVID-19 lockdown. Among others, we can highlight the changes in daily routines, such as the time of waking up, from work, commuting to work, being with family, and children's school activities. Changes in these parameters, lead to disruptions in sleep and circadian rhythms [1]. In addition, establishing and maintaining healthy habits of regular physical activity, an appropriate diet and for adequate sleep hygiene proved challenging as severe restrictions were imposed to keep the population at home as the pandemic progressed.

More than ever, regular physical activity and good dietary habits were important to maintain a good quality of life for the population during the COVID-19 lockdown [2].

Several studies from different countries have investigated the possible lifestyle changes during COVID-19 lockdown. In Brazil, for example, consumers were more likely to buy food from food delivery apps during the pandemic [3]. Food from such apps tends to be high in fat and sugar and high in calories [4]. During the pandemic, an increase in sedentary behavior was noted as stay-at-home orders interfered with active and physical activities during leisure time [5]. However, it is important to highlight these changes in different cultures so that we can assess the consequences of these lifestyle changes after the pandemic. We hy-

pothesized that disruption of sleep habits or lifestyle changes during COVID-19 lockdown would be associated with changes in sleep quality.

Although there are several studies on the effects of confinement on sleep quality, few studies examine multiple health variables in a single explanatory model. Human behavior is influenced by many variables and conditions. Therefore, a better explanation of the factors that influence sleep quality may lead to more robust recommendations.

In such a context, the present study aimed to evaluate the influence of changes in lifestyle acquired during the COVID-19 lockdown on sleep quality in a Brazilian population.

Methods

A cross-sectional study with 589 Brazilians from different states of the country was conducted as an online questionnaire survey posted between September and October 2021 during the COVID-19 pandemic phase. Non-probability referral sampling was used.

The survey instrument was created on the Google® Forms platform and distributed on the Internet through social networks. Members of the general public residing in Brazil and aged 18 years or older were invited to complete the survey. Respondent identification was not required, and participation was voluntary. The study received ethical approval from the Ethics Committee (Universidade Estadual de Campinas/Unicamp - n°: 4.913.547) and all participants electronically signed an informed consent form.

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The questionnaire was divided into 3 parts to obtain the maximum amount of data related to the objectives: (1) For sociodemographic variables, questions were asked about gender, age, status, cohabitation, education level, work status, and working conditions. (2) General habits (work time, commuting time, leisure time, proximity to family members, eating, alcohol and/or medication use, physical activity, and sleep) were measured using a 3-point scale: 1- worsening/decreasing, 2- no change, or 3- improvement/increase after lockdown. (3) The Mini Sleep Questionnaire (MSQ) was used to assess sleep quality, which evaluates aspects that qualify an individual's sleep pattern. A score from 10 to 70 was considered, divided into good sleep (10 to 24), slightly altered sleep (25 to 28); moderately altered sleep (28 to 30); and very altered sleep (over 30) [6].

Statistical analysis

Sociodemographic data was presented as percentages. The McDonald's Omega was used to assess the reliability of the MSQ. Values greater than 0.700 were considered sufficient.

Poisson regression (log-linear) was used, with MSQ score as the dependent variable. First, univariate analyses were performed. Significant variables were included in a multiple model. The independent variables were included as categorical variables (gender; age; alcohol consumption; physical activity, physical activity started, food habit and bed use). The first category served as an indicator. The model showed slight overdispersion (value/df = 1.69), but below 2.0. Omnibus test ($p < 0.001$) was performed, and showed that all independent variables together improved the model compared to the model with only the intercept. The exponential value of 'B' was used to calculate the odds ratio and its 95% confidence interval. Values of $p < 0.05$ were considered significant. All tests were conducted using the Statistical Package for Social Sciences (SPSS) v. 22.0.1.

Results

Of the 589 participants, 70.79% were women, and most respondents were younger than 30 years old (54.66%); 87.09% of the participants lived with their families. Most participants had postsecondary education (51.44%). In general, we observed that 82% were working, 42.27% continued to work personally during the lockdown, 40.23% reported that the workload increased after the lockdown began, and 50.76% reported that commuting time decreased after the lockdown began. It was also reported that 43.46% worsened their eating habits, with 16.29% starting to consume more alcohol. Regarding the practice of physical activity, 42.78% reported that they stopped or reduced the practice of physical activity; however, 13.92% started to practice physical activity after confinement.

The MSQ showed adequate reliability ($\omega = 0.781$). The worsening of sleep quality with the beginning of the pandemic was reported by 41.93%, with only 22.58% using the bed only to sleep or have sex, with the majority (48.55) using the bed sporadically to watch TV and/or have sex. or cell phone use. In general, the MSQ score was the 31.19 (very disturbed sleep).

We found an increased risk of MSQ score (worse sleep quality) in the age groups 31–45 years (OR = 1.12, 95% CI: 1.07–1.17) and over 65 years (OR = 1.17, 95% CI: 1.07–1.27); for those with increased alcohol consumption (OR = 1.08, 95% CI: 1.04–1.12), worsened their food habits (OR = 1.04, 95% CI: 1.00–1.08), used the bed to work (OR = 1.07, 95% CI: 1.02–1.11) and for those who reported that sleep worsened (OR = 1.32, 95% CI: 1.27–1.36) after initiation of lockdown. Moreover, the male gender (OR = 0.91, 95% CI: 0.88–0.94), increased the practice of physical activity (OR = 0.93, 95% CI: 0.88–0.97), or started the practice of physical activity (OR = 0.90, 95% CI: 0.87–0.95) during lockdown were protective factors for poor sleep quality (Table 1).

Discussion

As hypothesized, our results suggest that habit change during the COVID-19 lockdown affected sleep quality in a sample of the Brazilian population.

As factors that positively impacted the sleep quality, we can highlight male gender and the practice of physical activity. Regarding gender, our results are in agreement with those of Cellini et al. [7], who showed that women are more prone to remaining or becoming poor sleepers during home confinement. This is likely due to the higher prevalence of insomnia in this population [8], as well as the "gender gap" in child care [9] and elder care [10]. Our results show that more than 80% of the sample live with their family and also work. Therefore, there is a high probability that the women involved in the present study experience situations similar to those described in the above studies.

The active participants managed to significantly reduce the risk of impaired sleep quality. We found that engaging in physical activity during inclusion was a protective factor for poor sleep quality. During the COVID-19 pandemic, several studies examined the impact of lockdown on physical activity. Martínez-de-Quel et al. [11] emphasize that physical activity levels should be maintained during periods of high stress to prevent negative effects on sleep quality and self-perceived well-being. In addition, there is sufficient evidence suggesting that tailored and supervised exercise training may be an effective multisystemic therapy for post-COVID-19 syndrome that suits the diversity of the cases and symptoms [12].

In general, 41.93% of the participants reported impairments in sleep quality due to the lockdown. The results of the present study suggest that age, alcohol consumption, eating habits and using bed for work negatively affected sleep quality during the lockdown. The confinement was stressful and resulted in disruption of routine activities, changes in parental responsibilities and job duties [13]. Such changes are closely related to sleep quality. The negative effect of confinement on perceived sleep was most evident at older ages (over 46 years). Trakada et al. [14] demonstrated in a study that sleep duration was longer in young adults < 25 years and shorter in the 45–54 years group. The authors discuss that young adults usually increase sleep duration at weekends to recover from sleep restriction on weekdays.

Changes in eating habits during lockdown were also associated with worsening sleep quality, as expected [15]. Many aspects of diet can affect sleep quality, such as consumption of foods with a high glycemic index, caffeinated beverages, sugar-sweetened beverages, and unhealthy eating habits [16,17]. However, the relationship between dietary habits and sleep quality may be bi-directional [16]. It is also important to emphasize that domestic confinement, by influencing the stress and anxiety levels in the general population [18], may consequently also influence food choices.

Emerging data from several other countries [19–21] have shown an increase in alcohol consumption during the COVID-19 pandemic and that increased alcohol consumption was related to psychological stress and perceived threat associated with COVID-19. Our results corroborate these studies, as the increase in alcohol consumption in the evaluated population led to a worsening of sleep quality complaints.

Finally, a factor that occurred a lot in the pandemic was the changes in work arrangements that led to the intensification of flexible work in its various forms [22]. Perhaps this lack of routine in relation to the work schedules imposed by the lockdown may have led to a greater sleep complaint in the individuals in the present study who reported working in bed, in addition to greater exposure to light in the moments before bed.

According to our data, sleep quality during the COVID-19 lockdown was affected by the influence of some habits, such as increased alcohol consumption, inadequate diet and use of the bed for work. However, the individuals who reported good sleep quality during the lockdown showed a positive association with the practice of the exercise. In the context of COVID-19, we can suggest that promoting a healthy lifestyle,

Table 1
Risk factors for sleep quality during the COVID-19 lockdown.

Independent variables	Categories*	OR	CI 95%		p
Gender	Female	1.00	–	–	–
	Male	0.91	0.88	0.94	<0.001
Age	Less 30 years	1.00	–	–	–
	31–45 years	1.02	0.99	1.06	0.10
	46–60 years	1.12	1.07	1.17	<0.001
	Over 60 years	1.17	1.07	1.27	<0.001
Alcohol consumption	No changes	1.00	–	–	–
	Decreased alcohol consumption	1.01	0.97	1.06	0.44
	Increased alcohol consumption	1.08	1.04	1.12	<0.011
Physical activity	No changes	1.00	–	–	–
	Decreased physical activity	1.01	0.97	1.05	0.41
	Increased physical activity	0.93	0.88	0.97	0.004
Started physical activity	No	1.00	–	–	–
	Yes	0.90	0.87	0.95	<0.001
Food habit	No changes	1.00	–	–	–
	Worsen	1.04	1.00	1.08	0.03
	Improve	0.97	0.92	1.00	0.11
Bed use	Sleep and have sex	1.00	–	–	–
	Sporadic use of technology	1.02	0.98	1.06	0.20
	Work	1.07	1.02	1.11	0.002

* The first category was always the indicator; OR: Odds Ratio, CI: Confidence Interval.

both in terms of diet, physical activity and good sleep hygiene before bedtime is pivotal for improve a sleep quality.

These results open perspectives for future studies. First, it is important to assess whether these positive/negative habits acquired during COVID-19 lockdown persist after the pandemic. Second, robust strategies need to be employed to improve general health measures (e.g., dietary habits, physical activity, psychological measures), as they may interact and affect sleep quality.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Gabriela Vieira Minetto: Visualization, Formal analysis.
Diogo Thimoteo da Cunha: Formal analysis, Writing – review & editing.
Andrea Maculano Esteves: Conceptualization, Visualization, Formal analysis, Writing – original draft.

Acknowledgment

We thank all of the study participants for their cooperation.

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