Prevalence and variables associated with insomnia among COVID-19 survivors in Colombia

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Abstract. *Background and aim of the work.* The prevalence of insomnia is higher in COVID-19 survivors. However, there is little information about his associated variables. The aimed to know the prevalence and variables associated with insomnia among COVID-19 survivors in Colombian adults. *Method.* Three hundred and thirty COVID-19 survivors participated in a cross-sectional study. Insomnia was quantified with the Athens Insomnia Scale (cut-off score ≤ 6, Cronbach's alpha of 0.90). *Results.* COVID-19 survivors were between 18 and 89 years (Mean = 47.7, SD = 15.2); the majority were women (61.5%), university-educated (62.4%), low income (71.2%), married or free union (66.1%), not healthcare workers (85.8%), without comorbidities (63.0%), asymptomatic or mild COVID-19 (66.1%), duration of COVID-19 symptoms in less than three weeks (80.0%) and remission of symptoms less two months by the day of study participation (73.0%). Scores on the Athens Insomnia Scale were observed between 0 and 24 (M = 7.3, SD = 5.1, Me = 7, IQR = 3 − 10), 60% presented insomnia. Insomnia was associated with post-traumatic stress symptoms (OR = 8.8, 95% CI 2.7 − 29.5), COVID-19 symptoms for more than three weeks (OR = 2.1, 95% CI 1.1 − 3.9), female gender (OR = 1.9, 95% CI 1.2 − 3.2) and married or free union marital status (OR = 1.8, 95% CI 1.1 − 3.0). *Conclusion.* The frequency of insomnia in COVID-19 survivors is high and mainly related to post-traumatic stress, symptoms of COVID-19 for more than three weeks, and the female gender. It is necessary to implement follow-up studies over time to evaluate the persistence of insomnia. (www.actabiomedica.it)

Key words: Coronavirus disease; survivors; sleep disorders; insomnia; cross-sectional studies

Introduction

Insomnia is the inability to fall asleep or stay asleep (1). According to measurement techniques, before the COVID-19 pandemic, conciliation insomnia in the general population was observed between 15% and 42%, maintenance in 13% (2), and early awakening in 12% (3).

Insomnia can present as a unique problem, or it can be found in people with medical comorbidities, such as chronic pain syndromes (1). Likewise, insomnia can be an associated symptom in most mental disorders, for example, anxiety, depression, or significant cognitive impairment (4).

Insomnia is clinically significant because it significantly impairs general health and psychological well-being (5, 6). Insomnia is associated with a lower capacity to respond and recover effectively from traumatic events such as armed conflicts, natural disasters, terrorist attacks, epidemics, or confinement (7–9).

There are several instruments to assess insomnia in different populations (10). The Athens Insomnia Scale (AIS) is one of those instruments used and has shown high sensitivity and specificity to screen cases of insomnia (11). For example, in the general population, the prevalence of insomnia, quantified with AIS, was observed in 11% of 1,685 official employees in Japan (12), 27% in 1,325 women in menopause in

Colombia (13), and 48% in 144 patients with chronic pain in Japan (7).

During the COVID-19 pandemic, the prevalence of insomnia has increased significantly (14). Quantified with AIS, the prevalence of insomnia reached 38% in 2,427 participants from the general population in Greece (15). In the United States, in 513 healthcare workers, it found a prevalence of 64% (16). In Iraq, a prevalence of 68% was documented in 268 physicians from different hospitals (17). In 1,215 participants from 15 countries, a prevalence of 77% was observed (18). In Greece, 150 nurses reported that 49% had insomnia (19). Finally, in Poland, among 336 nurses and midwives was found that 45% presented moderate or severe clinical insomnia (20).

Possibly, the frequency of insomnia is higher among COVID-19 survivors. In Italy, 402 COVID-19 surviving adults found that 40% had insomnia by semi-structured interview (21). In China, in 230 survivors, 26% reported insomnia, quantified using the AIS (8). In Mexico, in 189 surviving participants, 77% had insomnia after discharge from COVID-19 based on medical history (22). Besides, 12% of 324 Chinese survivors were found to have insomnia during clinical evaluation (18).

In the general population during confinement for COVID-19, to date, insomnia has been associated with older age, female gender, economic problems, low social status, social isolation, low education, low family income, married marital status, presence of comorbidity, greater severity of infection, deteriorated health status, health work, and longer duration of infection (8, 18). In the same way, insomnia has been associated with stress-related COVID-19, anxiety, and depression (23).

COVID-19 survivors have had several experiences that can be configured as a significant stressor, for example, the severity of symptoms, the need for intensive care unit management with intubation, and closeness to other people who died during the hospital stay (24). Few studies are documenting the association between post-traumatic stress disorder (PTSD) and insomnia in COVID-19 survivors. In Iran, Mahmoudi et al. (25) documented in 844 COVID-19 survivors a statistically significant correlation between scores for PTDS and insomnia.

Information on the prevalence and variables associated with insomnia in COVID-19 survivors is scarce. Globally, Colombia is among the top ten countries with the highest number of reported cases in Latin America; it is the third country, after Brazil and Argentina (26). It is important to identify cases of insomnia in COVID-19 survivors, given the negative consequences on physical and mental health in the short and long term (27).

Exploring the frequency and associated variables in COVID-19 survivors provides the necessary information to guide follow-up actions in the recovery of COVID-19 survivors (28). Possibly, routine follow-up is limited to reviewing the course of symptoms of "post-COVID-19 syndrome" and forgetting to explore the impact on the sleep pattern of survivors (29). In clinical care, identifying and treating insomnia in COVID-19 survivors is vital to promote quality of life, well-being, and functionality (30).

The study's objective was to evaluate the prevalence and variables associated with insomnia among COVID-19 survivors in Santa Marta, Colombia.

Methods

Design and participants

A cross-sectional study was designed with a convenience sample, and COVID-19 survivors who physically or virtually consulted the specialized pneumology service for symptoms related or not related to COVID-19 participated. It was expected to have a sample of at least 330 COVID-19 survivors. This sample size is adequate to estimate magnitudes of associations and acceptable 95% confidence intervals (95% CI) (31).

Measurements

Athens Insomnia Scale

The severity of sleep disturbance was measured by the Athens Insomnia Scale (AIS) (11). The scale is a self-assessment instrument designed to quantify sleep difficulty according to the International Classification of Diseases 10th revision (ICD-10) criteria for insomnia.

It consists of eight items: the first five refer to the induction of sleep, awakenings during the night, the final awakening, total duration of sleep, and sleep quality, while the last three refer to well-being, the ability to function, and sleepiness during the day. On this scale, the severity of difficulty sleeping is measured based on a 4-point Likert scale from the last month. Scores range from zero (which means it is not a problem) to three (more acute difficulty sleeping). A cut-off score of 6 has been determined to differentiate patients with insomnia and healthy patients (11). This scale has shown acceptable psychometric performance in Colombia (32). The internal consistency (Cronbach's alpha) for the scale was 0.90.

Post-traumatic stress symptoms

Post-traumatic stress symptoms were assessed with the SPAN. The SPAN is a four-item instrument with five response options: never (0), seldom (1), sometimes (2), often (3), and always (4), with total scores between 0 and 20 (33). Based on a previous Colombian study, scores equal to or greater than twelve were categorized as post-traumatic stress risk (34). In the present study, the SPAN showed high reliability, Cronbach's alpha of 0.81.

COVID-19 disease severity

The clinical aspects of COVID-19 were determined by medical history: number and severity of symptoms, duration of symptoms, home or hospital management, and medical comorbidities.

Procedure

The patients were contacted in the pulmonology outpatient service of three health care institutions. Information was provided about the objectives of the study before signing informed consent. Patients completed the online questionnaire between October 12, 2020, and April 30, 2021.

Data analysis

In the descriptive analysis, frequencies and percentages were observed for the categorical variables, and mean (M), median (Me), standard deviation (SD), and interquartile range (IQR) were calculated. RD was taken as the dependent variable in the bivariate analysis, and other variables were taken as independent variables. Crude (OR) and adjusted (AOR) associations were estimated. The Greenland recommendations for the association adjustment process were followed; the associations were considered significant or probability values less than 0.20 (35). The final modelling had to fit adequately, that is, show a Hosmer-Lemeshow test with a p-value > 0.10 (36).

Ethical issues

The study was reviewed and approved by a research ethics committee of a public university in the Caribbean region, Colombia (Minutes 002 of March 26, 2020), following the Colombian research standard (37) and international regulation for the participation of humans in research (38). The AIS-8 is a free-to-use instrument for research purposes. All participants signed informed consent, did so voluntarily, and did not receive incentives.

Results

Three hundred and thirty-seven adult COVID-19 survivors were invited to participate, 97.9% (n = 330) agreed to participate. The ages of the participants were observed between 18 and 89 years (Mean = 47.7, SD = 15.2). The highest percentage of participants were between 18 and 59 years old, women, higher education, living in low-income areas, general population, no medical comorbidity, COVID-19 infection treated at home, symptoms less than three weeks and remission less than two months when participating in the study. More information is presented in Table 1.

Scores on the SPAN were between 0 and 15, [M = 4.1 (SD = 3.7), Me = 3 and IQR = 1 - 6], 13.3% scored for PTSD risk. While, the scores in the AIS were observed between 0 and 24 [M = 7.3 (SD = 5.1), Me = 7 and IQR = 3 - 10], 60.6% presented insomnia.

In the bivariate analysis, insomnia was related to female gender (OR = 1.70, 95% CI 1.09 − 2.67), being married or free union (OR = 1.64, 95% CI 1.03 − 2.61),

Table 1. Description of the participants (N = 330)

Variable	n	%
Age (years)		
18 – 59	263	79.7
60 or older	67	20.3
Gender		
Female	203	61.5
Male	127	38.5
Education		
Primary	29	8.8
Secondary	95	28.8
University	206	62.4
Income		
Low	235	71.2
High	95	28.8
Marital status		
Married or free union	218	66.1
Single or others	112	33.9
Healthcare worker		
Yes	47	14.2
No	283	85.8
Comorbidity		
yes	122	37.0
No	208	63.0
COVID-19 severity		
Without symptoms or mild (treated at home)	218	66.1
Moderate or severe	112	33.9
Without symptoms or inferior to three weeks		
Yes	264	80.0
No	66	20.0
Remission inferior to two months		
Yes	241	73.0
No	89	27.0

Table 2. Crude associations for insomnia in COVID-19 survivors

Variable	OR (95% CI)
Older than years old	0.82 (0.47 – 1.41)
Female	1.70 (1.09 – 2.67)
University education	1.39 (0.88 – 2.19)
High incomes	1.32 (0.80 – 2.17)
Married or free union	1.64 (1.03 – 2.61)
Comorbidity	0.81 (0.51 – 1.27)
Moderate or severe COVID-19	1.70 (1.05 – 2.75)
COVID-19 symptoms longer than three weeks	2.49 (1.33 – 4.66)
COVID-19 remission inferior to two months	0.77 (0.46 – 1.27)
Post-traumatic stress disorder risk	10.92 (3.30 – 36.07)

Table 3. Adjusted associations for insomnia in COVID-19 survivors

Variable	Adjusted OR (95% CI)
Post-traumatic stress disorder risk	8.84 (2.65 – 29.52)
COVID-19 symptoms longer than three weeks	2.05 (1.06 – 3.95)
Female gender	1.92 (1.16 – 3.19)
Married or free union	1.79 (1.07 – 3.00)

Discussion

In 60% of COVID-19 survivors, insomnia is present and is significantly associated with female gender, being married or common-law union, symptomatic of COVID-19 with three or more weeks, and PTSD risk.

In the present study, 60% of COVID-19 survivors had insomnia. This prevalence can be considered high in COVID-19 survivors since other studies documented lower prevalences, 12% in China (8) and 40% in Italy (21). However, the prevalence is less than the 77% observed in Mexico (22). This variability can be explained by methods to quantify insomnia and the demographic of the participants (39). It is necessary to consider that before the COVID-19 pandemic, the prevalence of insomnia quantified with the AIS had highly variable frequencies; nevertheless, reported prevalences did not exceed 50%. For

moderate or severe COVID-19 symptoms (OR = 1.70, 95% CI 1.05 – 2.75), COVID-19 symptoms longer than three weeks (OR = 2.49, 95% CI 1.33 – 4.66), and post-traumatic stress disorder risk (OR = 10.92, 95% CI 3.30 – 36.07). All associations are presented in Table 2. Finally, after adjusting, only post-traumatic stress disorder risk, COVID-19 symptoms longer than three weeks, female gender, and married or free union were significantly related to insomnia. See Table 3. The model showed an adequate fit (Hosmer-Lemeshow´s test = 2.61, df = 4, p = 0.63).

instance, 11% of Japanese official employees reported insomnia (12), 27% of Colombian menopausal women (13), and 48% of Japanese patients suffering from chronic pain (7). This higher frequency of insomnia in COVID-19 survivors may be mediated by biological factors, a direct effect on the central nervous system, or indirectly psychologically mediated by the perception of stress (40, 41).

In the present study, insomnia is higher in female survivors and married or free union. The findings diverge from what has been observed in other research. For example, in China, 121 survivors, independence between gender and marital status and insomnia was observed (8). Furthermore, a meta-analysis concluded that gender was not associated with insomnia in the population affected by COVID-19 (42). More research is needed that can identify possible biases that explain the disparities (39).

In the current study, COVID-19 symptoms for three or more weeks were related to insomnia. This observation is plausible because survivors with COVID-19 symptoms lasting three weeks or more are highly likely to experience distress and thus increased insomnia. Clinical evidence indicates that insomnia symptoms are persistent among the most distressing chronic symptoms derived from stressful events (40).

Besides, PTSD risk was associated with insomnia in the present study, and this finding is similar to that observed in previous research. Similarly, Mahmoudi et al. (25) observed a statistically significant association between scores for PTSD and insomnia. The association of PSTD symptoms with insomnia is frequent in clinical practice (4). Sleep difficulties are part of the diagnostic criteria for PTDS (24), and insomnia often predicts PTSD symptoms among COVID-19 survivors (43).

Clinical and practical implications

Neuropsychiatric symptoms observed in COVID-19 survivors suggest complex psychological and biological factors (41). Then, the management of COVID-19 survivors requires a holistic approach that considers the possible physical and psychological consequences (30). Primary care and clinical health professionals play a fundamental role in identifying sleep problems in COVID-19 survivors. Insomnia has clinical relevance because it is a risk factor for depression and suicidal behaviours (44).

Study strengths and limitations

This study is one of the few that presents the prevalence and associated variables in a middle-income country with a high notification of COVID-19 cases and survivors in Latin America. However, the study is based on a cross-sectional survey, which means that the causal relationship cannot be established, such as PTSD risk and insomnia. In addition, no history of chronic insomnia was assessed before the pandemic. Longitudinal studies are needed to clarify the causality direction (39). Likewise, insomnia and PTSD risk were assessed with self-report scales that can overestimate prevalences. Future studies should use a clinical interview for diagnostic accuracy (45).

Conclusions

The frequency of insomnia in COVID-19 survivors is high and is mainly associated with the female gender, symptoms of COVID-19 for more than three weeks, and the PTDS risk. Longitudinal studies are needed.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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