

Disorders associated with sleep quality in Ecuadorian healthcare personnel using the PSQI

Trastornos asociados a la calidad del sueño en personal sanitario ecuatoriano mediante el PSQI

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ABSTRACT

Objective: To determine the prevalence of sleep disorders and factors associated with sleep quality in Ecuadorian healthcare personnel using the Pittsburgh Sleep Quality Index (PSQI), analyzing the most frequently altered components and their implications for health and professional performance. **Methods:** A cross-sectional, observational, and analytical study was conducted with 189 healthcare professionals from public hospitals in Guayaquil, Ecuador, aged ≥ 50 years who worked during the COVID-19 pandemic. Data were collected through an online questionnaire between July and October 2025. The validated Spanish version of the PSQI was used, evaluating seven components of sleep quality. Descriptive statistics and chi-square tests were applied for association analysis ($p < 0.05$). **Results:** Poor sleep quality prevalence (PSQI > 5) was 63.49% (95%CI: 56.58%-70.40%), with 35.98% presenting severe cases (PSQI > 8). The most affected components were sleep duration (86.24% sleeping < 7 hours), habitual efficiency (64.55% with efficiency $< 85\%$), and latency (60.32% taking > 15 minutes to fall asleep). A significant association was found between sleep quality and daytime sleepiness (χ^2 : $p < 0.001$), with 82.35% of severe cases reporting somnolence versus 34.78% of good sleepers. Notably, 77.78% subjectively rated their sleep as “good” despite objective impairment. **Conclusions:** Ecuadorian healthcare personnel exhibit alarming sleep disorder prevalence exceeding general population estimates. The discrepancy between objective measurements and subjective perception suggests normalization of deficient sleep patterns, highlighting the need for systematic screening programs using validated instruments.

Keywords: Sleep disorders; sleep quality; healthcare personnel; Pittsburgh Index; epidemiology; Ecuador; prevalence; insomnia.

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RESUMEN

Objetivo: Determinar la prevalencia de los trastornos del sueño y los factores asociados con la calidad del sueño en el personal sanitario ecuatoriano utilizando el Índice de Calidad del Sueño de Pittsburgh (PSQI), analizando los componentes más frecuentemente alterados y sus implicaciones para la salud y el rendimiento profesional. **Materiales y métodos:** Se realizó un estudio transversal, observacional y analítico con 189 profesionales sanitarios de hospitales públicos de Guayaquil, Ecuador, de ≥ 50 años de edad que trabajaron durante la pandemia de COVID-19. Los datos se recopilieron mediante un cuestionario en línea entre julio y octubre de 2025. Se utilizó la versión española validada del PSQI, que evalúa siete componentes de la calidad del sueño. Se aplicaron estadísticas descriptivas y pruebas de chi-cuadrado para el análisis de asociación ($p < 0.05$). **Resultados:** La prevalencia de mala calidad del sueño ($PSQI > 5$) fue del 63.49 % (IC del 95 %: 56.58 %-70.40 %), con un 35.98 % de casos graves ($PSQI > 8$). Los componentes más afectados fueron la duración del sueño (86.24 % dormía < 7 horas), la eficiencia habitual (64.55 % con eficiencia < 85 %) y la latencia (60.32 % tardaba > 15 minutos en conciliar el sueño). Se encontró una asociación significativa entre la calidad del sueño y la somnolencia diurna (χ^2 : $p < 0.001$), con un 82.35 % de los casos graves que informaron somnolencia frente al 34.78 % de los que dormían bien. Cabe destacar que el 77.78 % calificó subjetivamente su sueño como “bueno” a pesar del deterioro objetivo. **Conclusiones:** El personal sanitario ecuatoriano presenta una prevalencia alarmante de trastornos del sueño que supera las estimaciones de la población general. La discrepancia entre las mediciones objetivas y la percepción subjetiva sugiere una normalización de los patrones de sueño deficientes, lo que pone de relieve la necesidad de programas de detección sistemática que utilicen instrumentos validados.

Palabras clave: Trastornos del sueño; calidad del sueño; personal sanitario; Índice de Pittsburgh; epidemiología; Ecuador; prevalencia; insomnio

INTRODUCTION

Sleep is a fundamental biological function for physical and mental health, and its adequate quality is a determining element for general well-being and the correct performance of cognitive and emotional functions. Sleep disorders represent a public health problem with an estimated prevalence of 35% in the general population (1). In particular, health professionals are a group potentially vulnerable to these alterations due to the characteristics inherent to their work activity, such as exposure to rotating shifts, night shifts, high care load and considerable emotional stress.

The importance of studying sleep quality in healthcare personnel transcends the scope of individual well-being, since sleep disturbances in this group can compromise patient safety, quality of care, and the efficiency of the healthcare system as a whole (2).

During the COVID-19 pandemic, this problem became relevant, with an increase in the prevalence of sleep disorders among health workers (3, 4.)

The Pittsburgh Sleep Quality Index (PSQI) (5) is one of the most widely used and validated instruments for the quantitative assessment of sleep quality in diverse clinical populations. It assesses both qualitative and quantitative aspects of sleep during the month prior to its application, providing an overall score that allows discriminating between “good” and “bad” sleepers. Its multidimensional structure makes it possible to identify the most frequently altered specific components, thus facilitating the design of targeted interventions.

The validation of this instrument in different cultural and linguistic contexts has demonstrated consistent psychometric properties. In Latin America, the Colombian validation of the PSQI was carried out, obtaining an adequate internal consistency (Cronbach's $\alpha = 0.78$) and confirming its ability to discriminate between patients with different levels of severity in sleep disorders⁶. More recently, normative data were established for the PSQI in the Honduran university population (7), providing relevant reference values for the Central American context.

In Ecuador, however, there is a notable paucity of epidemiological studies on sleep disorders using validated instruments such as the PSQI. This gap limits the understanding of the magnitude of the problem in the local context and hinders the development of intervention strategies adapted to the specific needs of the Ecuadorian population in general, and in particular of health personnel. The relevance of addressing this problem has increased in the post-pandemic context, considering the sustained impact of the health crisis on the well-being of health workers.

Previous studies in different geographical contexts have documented high prevalences of sleep disturbances in healthcare personnel, reporting a prevalence of 77.5% of sleep disorders in a sample of patients receiving palliative care (8), while a significant deterioration in sleep quality was observed in medical workers during the initial outbreak of COVID-19 (2). The perceptions of health workers in high-risk areas during the pandemic were also analyzed, identifying sleep as one of the significantly affected dimensions (9).

Various studies have specifically addressed sleep quality in health professionals. In Saudi Arabia (10), a significant association was identified between physical activity and



sleep quality in nursing, while another study explored the relationship between knowledge about sleep hygiene, physical activity, and sleep quality (11); and the association between sleep quality and stress in medical students has been pointed out, establishing significant correlations between both variables (12).

However, the accurate measurement of subjective sleep quality constitutes a significant methodological challenge, as has been pointed out in a review of assessment instruments (13). Even so, the PSQI has proven to be a robust and versatile tool for this purpose, being adapted and validated in multiple cultural contexts, as evidenced for Arab populations (14), the Czech Republic (15), and China (16).

Considering this background, the present study aims to determine the prevalence of sleep disorders and the factors associated with sleep quality in Ecuadorian health personnel using the PSQI, analyzing the most frequently altered components and their implications for health and professional performance.

MATERIALS AND METHODS

Research Design

An observational, cross-sectional, and analytical study was conducted to determine the prevalence of sleep disorders in Ecuadorian health personnel. The study used the Pittsburgh Sleep Quality Index (PSQI) as the main assessment instrument, following methodologies similar to those used in research on sleep quality in specific populations (17, 18).

Participants

The sample consisted of 189 Ecuadorian participants who voluntarily completed the PSQI questionnaire between July and October 2025. Data were collected through an online questionnaire distributed through digital platforms and professional networks in the health field. The methodological approach is consistent with that used in cross-sectional studies in Peru (19).

The inclusion criteria were: health professionals from public hospitals in Guayaquil, Ecuador; age ≥ 50 years and who worked during the Covid-19 pandemic; participants who were able to voluntarily complete the PSQI questionnaire and who provided informed consent prior to completing the questionnaire; health personnel of any professional category and specialty who were working full-time in the study period (July-October 2025). Healthcare professionals working in private hospitals or primary

care facilities, as well as those under 50 years of age, were excluded from the study. Professionals who did not work during the Covid-19 pandemic or who only worked in telemedicine mode were also excluded from the study, as they did not experience direct exposure to the hospital environment during the health crisis. Staff with part-time or short-time contracts were excluded to ensure comparable exposure to occupational factors that could affect sleep quality. It was decided not to include professionals who were on medical leave or on extended leave during the study period, as well as those with a previous diagnosis of sleep disorders under pharmacological treatment established before the pandemic, to avoid confounding factors in the evaluation of current sleep quality.

In addition, participants with a diagnosis of cognitive impairment or severe psychiatric disorders that could affect the reliability of the responses to the PSQI questionnaire were excluded. Finally, those professionals who refused to participate or who did not adequately complete the evaluation instrument did not participate in the analysis.

Instrument

The Pittsburgh Sleep Quality Index (PSQI) (5) validated in Spanish was used⁶. The instrument consists of 19 self-assessment items that generate scores for seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of hypnotic medication, and daytime dysfunction.

Each component receives a score from 0 to 3, with a higher score indicating poorer sleep quality. The sum of the scores of the seven components generates an overall score that can range from 0 to 21 points. An overall score greater than 5 indicates poor sleep quality, while scores above 8 suggest serious sleep problems (6, 20).

The PSQI has demonstrated adequate psychometric properties in various contexts, with an internal consistency (Cronbach's α) ranging from 0.78 to 0.83 according to different validations (5, 6, 21, 22). The Spanish adaptation has shown a sensitivity of 88.63% and a specificity of 74.99% using 5 as a cut-off point (6).

Procedure

The questionnaire was distributed electronically among health professionals through digital platforms, professional networks and institutional email. Prior to participation, detailed information about the study objectives was provided and informed consent was



obtained from all participants. The anonymity and confidentiality of the data was guaranteed.

Participants completed the questionnaire between July and October 2025. Detailed instructions were included for its completion, following the established guidelines (5) and adapted to the Hispanic American context (6).

Data analysis

The data were analyzed using statistical, descriptive and inferential techniques. Frequencies and percentages were calculated for categorical variables, as well as measures of central tendency (mean, median) and dispersion (standard deviation, range) for quantitative variables (scores), following similar methodological approaches²³. To estimate the prevalence of poor sleep quality, the proportion of participants with an overall PSQI score greater than 5 (standard cut-off point) and greater than 8 (cut-off point for serious problems) was calculated, with their respective 95% confidence intervals. The dual approach to the cut-off point is consistent with previously validated proposals (6).

A detailed analysis of each component of the PSQI was carried out to identify the most frequently disturbed aspects of sleep, calculating the frequency distribution for each score level (0-3) in the seven components, and specific patterns of sleep disturbance could be identified (24, 25).

The hypotheses put forward are: a) The prevalence of poor sleep quality (PSQI>5) in the Ecuadorian sample exceeds the 35% reported in the general population, with a significant proportion of severe cases (PSQI>8) associated with greater daytime dysfunction; b) The most affected components of PSQI are sleep duration and nocturnal disturbances, particularly nocturnal awakenings and nocturia; and c) There is a significant association between sleep quality and the presence of daytime sleepiness.

To analyze associations between variables, non-parametric tests (chi-square: X^2) were used given the ordinal nature of many of the PSQI variables, following methodologies proven in studies on circadian preferences and insomnia (24).

All analyses were performed using specialized statistical software (Jamovi 2.7.6), with a significance level set at $p < 0.05$ for all statistical tests.

Ethical considerations

The study was approved by the Research Ethics Committee of the corresponding institution. All participants provided their informed consent prior to completing the questionnaire. The confidentiality and anonymity of the data were guaranteed, and the ethical principles for research on human beings established in the Declaration of Helsinki were respected. The use of Artificial Intelligence (AI) tools in the management of bibliographic references is declared.

RESULTS

Prevalence of sleep disorders

The analysis of the data collected through the PSQI in a sample of 189 Ecuadorian participants revealed a high prevalence of sleep disorders. The mean PSQI score in the total sample was 7.43 points (SD=3.67), with a median of 7 points and a range ranging from 1 to 17 points. Such values exceed the standard cut-off point of 5 points established⁵ to discriminate between good and bad sleepers.

Using this standard cut-off point, the prevalence of poor sleep quality (PSQI>5) was 63.49% (95% CI: 56.58%-70.40%), significantly higher than the estimate of 35% reported for the general population¹. These results are consistent with the findings reported in healthcare professionals during the COVID-19 pandemic³.

When applying a stricter criterion (PSQI>8)^{6,20} to increase the specificity of the instrument, the prevalence of severe cases was 35.98% (95% CI: 29.11%-42.85%). This data is worrying, as it indicates that more than a third of the sample has sleep problems of considerable severity. The distribution of PSQI scores in the sample studied is presented in Table 1.

Table 1

Distribution of Pittsburgh Sleep Quality Index scores in the sample studied

Category	PSQI Score	n	%	95% CI
Good sleepers	≤ 5	69	36.51%	29.60%-43.42%
Bad sleepers	> 5	120	63.49%	56.58%-70.40%
Mild to moderate cases	6-8	52	27.51%	21.13%-33.89%
Severe cases	> 8	68	35.98%	29.11%-42.85%

Note. PSQI = Pittsburgh Sleep Quality Index; 95% CI = 95% confidence interval.

The frequency distribution of the overall PSQI scores shows a significant concentration in the range of 6 to 10 points, indicating a predominance of mild to moderate severity



cases, although the presence of a significant subgroup with scores above 12, indicative of very severe sleep disorders, is also noteworthy (Table 1).

Analysis of the individual components of the PSQI

Detailed analysis of the individual components of the PSQI allowed us to identify the most frequently disturbed aspects of sleep in the population studied. Table 2 presents the mean scores and frequency distribution for each of the seven components.

Table 2

Analysis of the individual components of the PSQI in the total sample

Component	Average Score (SD)	Score 0 (%)	Score 1 (%)	Score 2 (%)	Score 3 (%)
C1: Subjective quality	0.99 (0.84)	28.04%	49.74%	16.93%	5.29%
C2: Latency	1.13 (0.92)	26.46%	41.27%	25.40%	6.87%
C3: Duration	1.78 (0.80)	3.70%	32.28%	46.56%	17.46%
C4: Typical efficiency	1.24 (1.15)	35.45%	25.40%	18.52%	20.63%
C5: Disturbances	1.11 (0.59)	8.99%	74.60%	12.70%	3.70%
C6: Use of medication	0.34 (0.71)	77.78%	13.23%	6.35%	2.65%
C7: Daytime dysfunction	0.84 (0.96)	43.39%	35.98%	14.29%	6.35%

Note. PSQI = Pittsburgh Sleep Quality Index; SD = Standard Deviation.

As can be seen in the table above, sleep duration (C3) was the most affected component, with a mean score of 1.78 (SD=0.80), followed by habitual sleep efficiency (C4) (1.24±1.15) and sleep latency (C2) with an average of 1.13 (SD=0.92). The least affected component was the use of hypnotic medication (C6) (0.34±0.71).

Sleep duration showed a clearly problematic pattern, with 86.24% of participants reporting sleeping less than 7 hours (less than 5 hours: 17.46%, 5-6 hours: 20.63%, 6-7 hours: 57.67%). Only 13.76% of the participants reported sleeping more than 7 hours, the recommended duration for adults (17).

As for the subjective quality of sleep, it is striking that only 22.22% of the participants considered it “quite bad” or “very bad”, while 77.78% rated it as “quite good” or “very good”. The discrepancy observed between subjective perception and objective measurement using the PSQI indicates a possible normalization of deficient sleep patterns, a phenomenon also observed in a study with patients in palliative care (8).



Sleep latency and efficiency

The specific analysis of sleep latency revealed that 45.50% of the participants reported taking between 16-30 minutes to fall asleep, 13.40% between 31-60 minutes, and 2.15% more than 60 minutes. Also 39.68% reported a latency of less than 15 minutes, considered optimal according to the established criteria (5).

Regarding sleep efficiency (relationship between time asleep and time in bed), 35.45% presented excellent efficiency ($\geq 85\%$), while 25.40% showed good efficiency (75-84%), 18.52% regular efficiency (65-74%) and 20.63% poor efficiency ($< 65\%$). The distribution shows that more than a third of the sample (39.15%) has significant sleep efficiency problems, suggesting difficulties in maintaining sleep once it has begun.

Sleep disturbances

Table 3 presents a detailed analysis of the main sleep disturbances reported by the participants, showing the percentage who experience them with high frequency (three or more times a week).

Table 3

Prevalence of major sleep disturbances experienced three or more times a week

Type of disturbance	n	%	95% CI
Coughing or snoring loudly	26	13.76%	8.89%-18.63%
Having to get up to go to the bathroom	24	12.70%	7.99%-17.41%
Waking up during the night or early morning	17	8.99%	4.92%-13.06%
Feeling too hot	15	7.94%	4.08%-11.79%
Suffering from pain	10	5.29%	2.09%-8.50%
Feeling cold	7	3.70%	1.01%-6.40%
Having nightmares or bad dreams	2	1.06%	0.00%-2.52%
Not being able to breathe well	1	0.53%	0.00%-1.56%

Note. 95% CI = 95% confidence interval.

The most frequently reported sleep disturbances (three or more times a week) were: noisy coughing or snoring (13.76%), having to get up to go to the toilet (12.70%), waking up during the night or early morning (8.99%), feeling too hot (7.94%), and suffering from pain (5.29%). The disturbances reflect a combination of physiological (nocturia, snoring), environmental (temperature), and potentially pathological (pain) factors that affect sleep continuity.

The high prevalence of snoring (13.76%) is relevant, as it may be an indicator of sleep-disordered breathing such as obstructive apnea, a condition that requires specific evaluation and treatment given its potential cardiovascular and neurocognitive complications.



Use of hypnotic medication

In relation to the use of hypnotic medication, 77.78% of the participants reported not having used sleep medication during the last month, while 13.23% used it less than once a week, 6.35% once or twice a week, and only 2.65% three or more times a week. The low use of medication contrasts with the high prevalence of poor sleep quality, suggesting a possible undertreatment or preference for non-pharmacological strategies. The discrepancy observed between the prevalence of sleep problems and the use of medication coincides with the reports from Spain (8), although in this study with palliative patients the proportion of frequent use of medication was significantly higher (60%), probably due to the specific characteristics of this population.

Daytime dysfunction

The assessment of daytime dysfunction, which includes sleepiness during daily activities and motivational difficulties, showed that 43.39% of the participants reported not having experienced daytime sleepiness in the past month, while 56.61% experienced it with some frequency (less than once a week: 24.34%, once or twice a week: 23.81%, three or more times a week: 8.47%).

Regarding difficulties in maintaining mood during daily activities, the distribution was similar, with 40.74% reporting some degree of problem (mild: 23.81%, moderate: 12.70%, severe: 4.23%). Table 4 presents a cross-analysis between sleep quality (according to PSQI) and the presence of daytime dysfunction.

Table 4
Relationship between sleep quality and daytime dysfunction

Sleep quality	No daytime sleepiness	Daytime sleepiness	Total	P-Value
Good Sleepers (PSQI ≤ 5)	45 (65.22%)	24 (34.78%)	69 (100%)	< 0.001
Bad sleepers (PSQI > 5)	37 (30.83%)	83 (69.17%)	120 (100%)	< 0.001
Severe cases (PSQI > 8)	12 (17.65%)	56 (82.35%)	68 (100%)	< 0.001

Note. PSQI = Pittsburgh Sleep Quality Index. p-value calculated by chi-square test.

As can be observed, there is a statistically significant association between sleep quality and the presence of daytime sleepiness. Among good sleepers, 65.22% did not experience daytime sleepiness ($X^2: < 0.001$), and only 34.78% reported experiencing sleepiness during daily activities. Daytime sleepiness rose to 69.17% among poor sleepers ($X^2: < 0.001$) and 82.35% among severe cases ($X^2: < 0.001$). The association is



particularly relevant considering the potential implications of daytime sleepiness for safety and work performance in healthcare professionals.

Sleep duration and subjective quality

Considering the discrepancy observed between the objective assessment of sleep quality and subjective perception, a specific analysis of the relationship between these aspects was performed. Table 5 presents the cross-distribution between sleep duration and reported subjective quality.

Table 5

Relationship between sleep duration and subjective quality

Sleep duration	Very good CS	CS Bastante buena	CS Plenty of suitcase	Very bad CS	Total
> 7 hours	11 (42.31%)	13 (50.00%)	2 (7.69%)	0 (0.0%)	26 (100%)
6-7 hours	35 (31.82%)	59 (53.64%)	14 (12.73%)	2 (1.8%)	110 (100%)
5-6 hours	5 (12.82%)	18 (46.15%)	12 (30.77%)	4 (10.26%)	39 (100%)
< 5 hours	2 (6.06%)	4 (12.12%)	20 (60.61%)	7 (21.21%)	33 (100%)
Total	53 (28.04%)	94 (49.74%)	48 (25.40%)	13 (6.88%)	189 (100%)

Note. CS = subjective quality.

The table shows a clear association between sleep duration and subjective perception of sleep quality ($X^2: < 0.001$). Among those who sleep more than 7 hours, 92.31% consider their sleep as “very good” or “quite good”, a proportion that progressively decreases to 85.46% among those who sleep 6-7 hours, 58.97% among those who sleep 5-6 hours, and only 18.18% among those who sleep less than 5 hours.

However, it is striking that even among those who sleep less than 5 hours, 18.18% consider their sleep quality as “very good” or “quite good”, which could reflect an adaptation to poor sleep patterns or an underestimation of real sleep needs.

DISCUSSION

The results reveal an alarming prevalence of poor sleep quality in the sample of Ecuadorian health personnel, with 63.49% of participants classified as “poor sleepers” according to the PSQI. The percentage exceeds the estimate of 35% reported for the general population (1) and is consistent with the high prevalences found in other studies with health professionals² during the COVID-19 pandemic (prevalences greater than 60%), and authors who reported significant alterations in the sleep characteristics of health workers exposed to the pandemic (3).



The prevalence identified in this study is somewhat lower than that reported by other studies (8), which found 77.5% of “bad sleepers” in a sample of patients in palliative care. Such a difference is to be expected considering the specific characteristics of the population studied by these authors, with a greater burden of physical and emotional symptoms. However, the coincidence in the general pattern of high prevalence of sleep disorders reinforces the consistency of the findings reported in this work.

The detailed analysis of the components of the PSQI allowed us to identify that sleep duration is the most frequently altered aspect, with 86.24% of participants sleeping less than 7 hours, the minimum duration recommended for adults. This result should be taken into account considering the growing evidence on the negative effects of chronic sleep deprivation on physical and mental health. Other studies have shown that total sleep duration is one of the main modulators of PSQI responses (25), and have documented how reduced sleep time during periods of crisis can be associated with cognitive decline, immune alterations, and increased susceptibility to mental health problems (1).

The high prevalence of prolonged latency (more than 15 minutes in 60.32% of the sample) and reduced sleep efficiency (less than 85% in 64.55%) could indicate the presence of a pattern of insomnia in Brazilian university students (17) and in students during exam periods (23), inferring from this that academic and work stress may be a common denominator in these alterations.

The analysis of specific sleep disturbances revealed a notorious prevalence of snoring (13.76%) and nocturia (12.70%). The frequency indicated is striking, as it can be a marker of sleep-disordered breathing such as obstructive apnea, a condition associated with increased cardiovascular risk and neurocognitive impairment (34). Nocturia, on the other hand, can reflect both urological alterations and sleep fragmentation due to other causes (13).

An observation to highlight is the discrepancy between objective sleep quality (63.49% of poor sleepers according to PSQI) and subjective perception (only 22.22% consider their sleep “quite bad” or “very bad”). The incongruence detected suggests a possible normalization or adaptation to deficient sleep patterns consistent with those who found that 62.6% of patients in palliative care considered their sleep as “good or very good” despite an objective prevalence of disorders of 77.5% (8).



The low use of hypnotic medication (only 2.65% use it frequently) contrasts substantially with the high prevalence of sleep disorders. The discrepancy identified differs from what was reported (8), who found frequent use of hypnotics in 60% of their sample. This could be explained by the specific clinical context (palliative care), but it also suggests a possible undertreatment or preference for non-pharmacological strategies in the group studied.

Daytime sleepiness, reported by 56.61% of the participants, represents a finding that has important implications for safety and work performance. The significant association between sleep quality and the presence of sleepiness (82.35% in severe cases vs. 34.78% in good sleepers) underscores the functional impact of sleep disorders. The results are consistent with what has already been reported (26), a study that identified similar associations in university students, and by relationships between the impact of COVID-19 on sleep and the daytime functioning of medical call center personnel (27).

Limitations and future directions

Some limitations should be considered in the interpretation of its results. The cross-sectional design does not allow causal relationships to be established, so longitudinal studies²⁵ should be considered to know the temporal evolution of sleep patterns and their determinants. The absence of specific demographic data limits the possibility of stratified analyses by variables such as age, sex, professional category or medical specialty (10, 12).

Data collection through an online questionnaire, although it facilitated access to a large sample, may have introduced selection biases, favoring the participation of individuals with greater interest or concern about their sleep patterns (28). The exclusive use of subjective measures (PSQI) without complementing objective assessments (polysomnography, actigraphy) is another limitation, as has already been pointed out (15, 29). Finally, the specific temporal context of the study (post-COVID-19 pandemic) could have influenced the reported sleep patterns, as demonstrated in reviews on the psychological sequelae of the pandemic in different populations (30).

Based on the findings and limitations reported, the following lines of future research are proposed:

- a) Longitudinal studies that evaluate the evolution of sleep patterns in healthcare personnel over time and in different work contexts, following methodological approaches similar to those used in studies on determinants of sleep quality (18).
- b) Research that combines subjective measures (PSQI) with objective assessments (actigraphy, polysomnography) to obtain a more complete characterization of sleep disorders in this population, as has been suggested (31).
- c) Analyses stratified by demographic, professional, and organizational variables to identify subgroups that are especially vulnerable to sleep disorders (25).
- d) Evaluation of the effectiveness of different interventions (educational, organizational, clinical) to improve sleep quality in health personnel (32).
- e) Studies that specifically analyze the relationship between sleep quality, medical errors, and patient safety, using rigorous methodologies (33).
- f) Research with mixed methodology that complements quantitative data with qualitative approaches to better understand the subjective experience of sleep and the contextual factors that influence it, as indicated in the establishment of normative data for the PSQI (7).

CONCLUSIONS

An alarming prevalence of poor sleep quality is revealed in the sample of Ecuadorian health personnel studied, with 63.49% of participants classified as “poor sleepers” according to the PSQI and 35.98% presenting severe cases (PSQI>8). These figures exceed the estimates for the general population reported in the literature and are consistent with previous studies in health professionals, especially in contexts of high care pressure.

The most frequently altered components were sleep duration, with 86.24% of participants sleeping less than 7 hours, and nocturnal disturbances, particularly snoring (13.76%) and nocturia (12.70%). The high prevalence of snoring suggests a possible high incidence of sleep-disordered breathing in this population, an aspect that requires specific evaluation given its potential health implications.

The observed discrepancy between objective assessment (63.49% of poor sleepers) and subjective perception (only 22.22% consider their sleep “quite bad” or “very bad”) suggests a possible normalization of deficient sleep patterns in this population, which

could delay seeking help and timely treatment. These findings underscore the importance of implementing systematic screening programs using validated instruments such as the PSQI, without relying exclusively on subjective impression.

Daytime sleepiness, reported by 56.61% of the participants, represents a problem with potential implications for patient safety and quality of care. The strong association identified between sleep quality and the presence of sleepiness (82.35% in severe cases vs. 34.78% in good sleepers) evidences the functional impact of sleep disorders, and justifies the implementation of interventions aimed at improving sleep quality as a strategy to optimize professional performance.

Insufficient sleep duration emerges as the most determinant of daytime dysfunction, suggesting that interventions aimed at ensuring adequate rest time could have a significant impact on reducing sleepiness and improving daytime functioning.

Overall, the findings provide an empirical basis for the development of institutional policies and intervention programs aimed at improving sleep quality in health personnel, considering this aspect as a determining factor both of individual well-being and of the quality and safety of care.

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