Nature and Science of Sleep

Elevate Series

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ORIGINAL RESEARCH

# Sleep Quality and Insomnia Prevalence Among a Saudi Population: A Descriptive Study

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**Background:** Sleep quality is a critical factor for maintaining physical and mental well-being, with insomnia being one of the most common sleep disorders affecting global populations.

**Aim:** To assess sleep quality and estimate the prevalence of insomnia among the general population across all regions of Saudi Arabia.

**Methods:** A cross-sectional study was conducted using data from the Sharik Diet and Health Survey (SDHS), covering all 13 administrative regions of Saudi Arabia. The sample comprised 6051 participants aged between 18 and 90 years. Sleep quality and insomnia levels were evaluated using structured phone interviews conducted from July to August 2023.

**Results:** The majority of participants did not report suffering from insomnia, with only a small fraction indicating its presence. The prevalence of insomnia, based on participant-reported dissatisfaction with sleep patterns, was relatively low, with 21.5% of respondents reporting dissatisfaction (16.1% "Not Satisfied" and 5.4% "Very Unsatisfied"). Additionally, 42.4% of participants reported being "Not Concerned" about their sleep, while 33.9% experienced no interference with daily life due to sleep issues.

**Conclusion:** This study provides valuable insights into sleep quality and insomnia prevalence among the general population in Saudi Arabia. Although the overall prevalence of insomnia is lower compared to previous studies, a notable subset of the population experiences dissatisfaction and concerns regarding sleep. These findings underscore the need for targeted interventions addressing socio-economic disparities and mental health factors to improve sleep quality. Future research should focus on longitudinal assessments to better understand the factors influencing insomnia and the effectiveness of intervention strategies.

**Plain Language Summary:** This study looked at sleep quality and insomnia (difficulty falling asleep or staying asleep) among adults in Saudi Arabia. Good sleep is essential for both physical and mental health, helping people feel energized and focused during the day. However, insomnia is a common sleep disorder worldwide, impacting millions and leading to problems like fatigue, irritability, and reduced quality of life.

The researchers collected data from 6051 adults across Saudi Arabia's 13 administrative regions through phone interviews. Participants were asked about their sleep patterns, satisfaction with sleep quality, and any concerns related to sleep. The study aimed to understand how many people experience insomnia and factors affecting sleep quality among different groups in the population.

Findings showed that while most participants were generally satisfied with their sleep, about 21.5% expressed dissatisfaction, and 42.4% reported no concerns about their sleep. These results suggest that insomnia is less prevalent in this sample compared to other studies, but some people still face sleep difficulties. Additionally, insomnia was more common in certain groups, including people with lower income or those reporting other health issues.

This study highlights the need for targeted health programs to address sleep quality and suggests that improving sleep health in the population could benefit overall well-being. The researchers recommend more studies to explore why sleep issues occur and how to effectively support those affected.

**Keywords:** sleep disorders, public health, mental well-being, health disparities, Saudi Arabia population, sleep patterns

## Introduction

Sleep is a fundamental human need that plays a crucial role in maintaining physical and mental well-being. Sleep quality encompasses key parameters such as duration, latency, continuity, and depth, which contribute to overall health. Poor



Received: 17 November 2024
Accepted: 22 March 2025
Published: 12 April 2025

sleep quality can result in fatigue, mood disturbances, and cognitive impairment.[1] Insomnia, a common sleep disorder, is characterized by persistent difficulty in initiating or maintaining sleep despite adequate opportunity for rest. It is classified as chronic (lasting ≥3 months) or short-term, often triggered by stressors.[2] Studies highlight a bidirectional relationship between poor sleep quality and insomnia, emphasizing the need for further investigation.[3]

Optimal sleep quality, as defined by the National Sleep Foundation, involves adequate sleep duration, efficiency >85%, minimal awakenings, and reduced wakefulness.[2] Disruptions in these parameters are linked to long-term health issues, including cardiovascular diseases, metabolic disorders, and mental health conditions.[4–6] Insomnia is associated with distress, impaired daily functioning, and reduced quality of life. Despite its prevalence, sleep disorders remain underdiagnosed and undertreated in many populations.[6]

Insomnia and poor sleep quality are associated with numerous adverse health outcomes, including an increased risk of cardiovascular disease, hypertension, metabolic disorders, and impaired cognitive function. Furthermore, insufficient or disrupted sleep has been linked to compromised immune function, mental health conditions such as anxiety and depression, and decreased overall well-being. In sleep medicine, early identification and management of insomnia play a crucial role in preventing long-term complications and improving patient outcomes. Given the high prevalence of sleep disorders worldwide, including the Gulf region, there is an urgent need for population-based studies that assess sleep quality and insomnia prevalence using validated sleep medicine tools.

Limited research exists on the general prevalence of insomnia in the Middle East. Studies in Turkey and Lebanon estimated insomnia rates at 12.2–15.3% and 47.1%, respectively.[7–9] In the Gulf Cooperation Council (GCC) countries, insomnia prevalence has been reported at 66.7% in the UAE, 64.4% in Saudi Arabia, and 63.9% overall.[10] Country-specific research in Bahrain found insomnia rates at 17.4% (ISI), while Qatar reported 3.0–5.5% based on different diagnostic criteria.[11,12]

In Saudi Arabia, studies indicate widespread sleep deprivation, with 50% of the population sleeping less than seven hours per night.[13] A study in Riyadh found an insomnia prevalence of 77.7% among healthy participants.[14] Primary care studies reported rates of 76.4% in Riyadh and 60.1% in Aseer.[15,16] During the COVID-19 pandemic, 52.6% of Saudi undergraduate students reported sleep disturbances linked to stress, anxiety, and depression.[17,18] Despite these findings, population-wide research on sleep quality and insomnia prevalence remains limited.

This study aims to assess sleep quality and estimate insomnia prevalence across all regions of Saudi Arabia. By analyzing national data, this research will contribute to understanding the impact of sleep disorders and inform future interventions to improve sleep health.

# Materials and Methods

## Study Design

This study involves a secondary analysis of data from the Sharik Diet and Health Survey (SDHS) of 2024[19–24] SDHS conducts brief, cross-sectional phone interviews across all 13 administrative regions of Saudi Arabia each year since 2019. Each interview lasts approximately 8 to 10 minutes and is conducted by trained data collectors. SDHS utilizes the ZdataCloud® research data collection system, which includes integrated eligibility and sampling modules to ensure sample distribution control and prevent human-related sampling bias. All data are coded and stored within the database system.

## Study Setting, Participants, and Sampling

This study was conducted across all regions of Saudi Arabia, including participants from areas such as Riyadh, Makkah, and the Eastern Province. The study population consisted of residents who met the inclusion criteria: Arabic speakers currently residing in Saudi Arabia. Those younger than 18 years, individuals who declined participation, non-Arabic speakers, and residents outside the country were excluded. This geographic representation allowed for a comprehensive assessment of sleep quality and insomnia prevalence across the Kingdom.

The sample size was determined based on the desired level of sub-analysis, aiming to compare age and gender groups across regions, with an estimated medium effect size of 0.26, 80% statistical power, and a 95% confidence level.[25] As

a result, each quota was set to include 115 participants, totaling 460 individuals per region and 5980 participants overall. Once the quota was fulfilled, individuals with similar characteristics were excluded from further participation. The quota sampling process was automated and managed by the database system, minimizing human involvement and reducing sampling bias. Since database system was used for data collection, no missing values occurred, and the system's data integrity verification feature helped prevent inaccurate data entry. Quotas were closed once the target sample size was reached. However, due to simultaneous phone call attempts, more than one participant occasionally passed the eligibility screening at the same time, resulting in a slightly larger sample size in some quotas.

## Participants and Recruitment

Recruitment was limited to Arabic-speaking Saudi residents aged 18–90 years. A random list of phone numbers was generated from the Sharik Association for Research and Studies database to identify potential participants. The Sharik database comprises individuals interested in future research projects and includes over 74,000 registered participants, distributed across Saudi Arabia's 13 regions. Participants were contacted up to three times; if they did not respond, a new number with similar demographic characteristics was selected until the quota was filled. After obtaining consent, the interviewer evaluated the participant's eligibility according to the quota completion criteria. Due to the automated quota closure system in database system, simultaneous phone calls sometimes allowed more than one eligible participant, occasionally resulting in slightly larger sample sizes for some quotas.[26–28]

## Questionnaire Design and Validation

The variables extracted from the SDHS database included age, gender, income level, self-rated health, and scores from validated scales such as the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder (GAD-7), and Insomnia-3. Permissions to use these tools were obtained where required, and publicly available tools were used in accordance with their original validation guidelines.

- PHQ-9: A widely used instrument for assessing depression, with strong reliability (Cronbach's alpha > 0.80) and validity in various populations. A score >10 was used to identify participants at high risk of depression.[29]
- GAD-7: A validated tool for measuring generalized anxiety, with a Cronbach's alpha of 0.92 and robust psychometric properties. A score ≥10 was considered indicative of clinically significant anxiety.[29]
- Insomnia-3: Derived from the Insomnia Severity Index (ISI), it evaluates the severity of insomnia symptoms using three core questions. A cut-off score of ≥10 was used to define insomnia, consistent with established guidelines. Insomnia-3 captures the essence of the ISI but focuses on brevity to ensure feasibility in phone-based surveys.

Sleep quality was assessed indirectly through Insomnia-3 scores and self-reported data on sleep duration, sleep continuity, and perceived restfulness upon waking. These measures provided a comprehensive view of sleep health while maintaining survey efficiency.

## Ethical Considerations

This study received approval from the ethics committee of the Sharik Association for Health Research (Approval no. 06–2021), in compliance with national research ethics regulations. The ethics committee approved the verbal consent process, and verbal consent was obtained from all participants during phone interviews. The consent was documented within the data collection system.

## Informed Consent Statement

Informed consent was obtained verbally from all participants as a prerequisite for study participation.

## Statistical Analysis

Frequencies and percentages were used to describe the variables in this study. Since the data were collected electronically, there were no missing data. Statistical analysis was conducted using SPSS version 22, and findings were reported

following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cross-sectional studies.[30]

## Results

Table 1 presents the demographic characteristics of the respondents (N = 6051). The gender distribution is nearly equal, with 49.7% male and 50.3% female participants. The age group spans 18–90 years, with the majority falling between 20–29 years (32.9%). Marital status indicates that 54.8% of respondents are married, while 45.2% are unmarried. The regional distribution of the sample is relatively balanced, with representation from all administrative regions, such as Asir (7.8%), Makkah (7.8%), and Riyadh (7.7%). Income levels show that 31.6% of participants have no stable income, 23.2% earn less than 5000 SR, and 4.3% earn more than 20,000 SR, reflecting socio-economic diversity.

Table 2 provides information on the self-rated health, depression, and anxiety of the respondents. When asked to rate their current health, 33.3% reported it as "Very Good", and 32.0% rated it as "Great". A smaller proportion rated their health as "Good" (22.9%), "Fair" (9.6%), or "Poor" (2.2%). Depression and anxiety levels were measured using validated scales (PHQ-9 and GAD-7). Most participants reported no signs of depression (97.3%) or anxiety (99.0%), while 2.7% of respondents indicated they experienced depression, and 1.0% reported anxiety.

Table 3 summarizes the participants' responses to insomnia-related questions over the past two weeks. Regarding satisfaction with sleep patterns, 22.5% of respondents were "Very Satisfied", and 27.0% were "Satisfied", while 29.0% reported being "Sometimes Satisfied". However, 16.1% were "Not Satisfied", and 5.4% were "Very Unsatisfied", indicating that nearly half of the respondents experienced some degree of dissatisfaction with their sleep. When asked about concern regarding sleep problems, 42.4% of participants reported being "Not Concerned at All", while 31.9% were "Slightly Concerned". A notable proportion expressed higher levels of concern, with 17.4% being "Moderately Concerned", 5.7% "Very Concerned", and 2.6% "Extremely Concerned". Sleep problems interfered with daily life for

**Table 1** Participant Demographical Characteristics Among Respondents (No= 6051)

| Characteristics | Total (%) |
|---|---|
| **Gender** | |
| Male | 3009 (49.7) |
| Female | 3042 (50.3) |
| **Age** | |
| 18–19 | 369 (6.1) |
| 20–29 | 1993 (32.9) |
| 30–39 | 1146 (18.9) |
| 40–49 | 1373 (22.7) |
| 50–59 | 803 (13.3) |
| 60+ | 367 (6.1) |
| **Marital status** | |
| Married | 3318 (54.8) |
| Not Married | 2733 (45.2) |

(*Continued*)

**Table 1** (Continued).

| Characteristics | Total (%) |
|---|---|
| **Regions** | |
| Asir | 470 (7.8) |
| Baha | 462 (7.6) |
| Eastern region | 463 (7.7) |
| Hail | 462 (7.6) |
| Jazan | 466 (7.7) |
| Al Jouf | 464 (7.7) |
| Madinah | 468 (7.7) |
| Makkah | 471 (7.8) |
| Najran | 463 (7.7) |
| Northern border | 460 (7.6) |
| Qassim | 468 (7.7) |
| Riyadh | 466 (7.7) |
| Tabuk | 468 (7.7) |
| **Income level** | |
| No stable income | 1910 (31.6) |
| Less than 5000 SR | 1401 (23.2) |
| 5001 to 8000 SR | 771 (12.7) |
| 8001 to 11000 SR | 599 (9.9) |
| 11001 to 13000 SR | 416 (6.9) |
| 13001 to 16000 SR | 377 (6.2) |
| 16001 to 20000 SR | 318 (5.3) |
| More than 20000 SR | 259 (4.3) |

**Table 2** General Health, Depression and Anxiety Among Respondents (No= 6051)

| Category | Frequency | Percentage (%) |
|---|---|---|
| **How do you rate your health today?** | | |
| Great | 1936 | 32.0 |
| Very Good | 2014 | 33.3 |
| Good | 1383 | 22.9 |
| Fair | 583 | 9.6 |
| Poor | 135 | 2.2 |

(*Continued*)


https://doi.org/10.2147/NSS.S503297

**Table 2** (Continued).

| Category | Frequency | Percentage (%) |
|---|---|---|
| **Depression** | | |
| No | 5886 | 97.3 |
| Yes | 165 | 2.7 |
| **Anxiety** | | |
| No | 5988 | 99.0 |
| Yes | 63 | 1.0 |

**Table 3** Descriptive Summary of Insomnia Among Respondents (No= 6051)

| Response | Frequency | Percentage (%) |
|---|---|---|
| **Insomnia 1: Over the past two weeks, how satisfied are you with your current sleep pattern?** | | |
| Very Satisfied | 1363 | 22.5 |
| Satisfied | 1635 | 27.0 |
| Sometimes Satisfied | 1753 | 29.0 |
| Not Satisfied | 973 | 16.1 |
| Very Unsatisfied | 327 | 5.4 |
| **Insomnia 2: Over the past two weeks, how concerned or worried have you been about your current sleep problems?** | | |
| Not Concerned at All | 2565 | 42.4 |
| Slightly Concerned | 1932 | 31.9 |
| Moderately Concerned | 1055 | 17.4 |
| Very Concerned | 342 | 5.7 |
| Extremely Concerned | 157 | 2.6 |
| **Insomnia 2: Over the past two weeks, how concerned or worried have you been about your current sleep problems?** | | |
| No Interference | 2050 | 33.9 |
| Slight Interference | 1941 | 32.1 |
| Moderate Interference | 1202 | 19.9 |
| Severe Interference | 615 | 10.2 |
| Very Severe Interference | 243 | 4.0 |

many participants: 33.9% reported "No Interference", 32.1% experienced "Slight Interference", and 19.9% reported "Moderate Interference". Severe and very severe interference was noted by 10.2% and 4.0% of respondents, respectively.

Figure 1 illustrate the prevalence of insomnia based on responses to the Insomnia-3 tool, which measures core insomnia symptoms (eg, dissatisfaction with sleep patterns, concern about sleep, and interference with daily life). Among the respondents, 21.6% met the criteria for insomnia (defined as scoring ≥10 on the Insomnia-3 scale). While the majority did not report symptoms consistent with insomnia, the findings indicate a substantial minority affected by this condition.

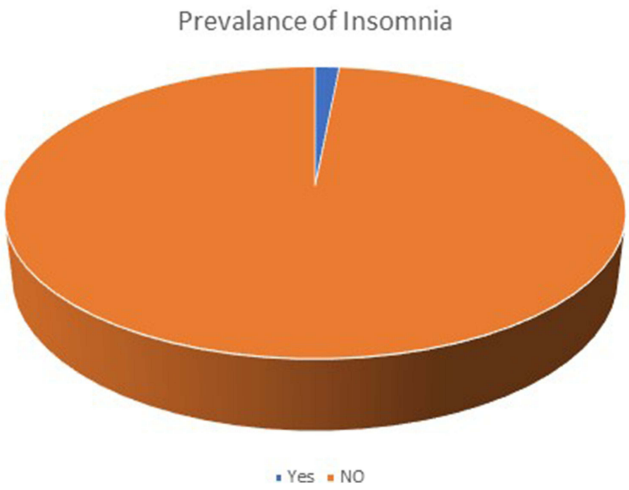


**Figure 1** Prevalence of insomnia among respondents (No= 6051).

## Linking Current Health to Insomnia Prevalence

Further analysis revealed a significant association between self-rated health and insomnia prevalence. Participants who rated their health as "Poor" or "Fair" reported higher rates of insomnia (37.5%) compared to those rating their health as "Good" (15.3%) or "Very Good/Great" (10.8%). This underscores the relationship between perceived overall health and sleep quality.

# Discussion

Sleep quality is a critical component of overall health, directly influencing both physical and mental well-being. Insomnia, defined as difficulty falling or staying asleep, is one of the most prevalent sleep disorders worldwide and has been associated with a range of health issues, including cardiovascular diseases, diabetes, and impaired cognitive functioning. Studies indicate that poor sleep quality is linked to increased risks of chronic conditions such as hypertension and depression, as well as reduced quality of life. In particular, individuals with insomnia are more likely to experience fatigue, irritability, and diminished productivity during the day, significantly impacting their quality of life.[31]

According to research conducted by Hertenstein et al, insomnia is not only a predictor of mental health disorders but also exacerbates symptoms of existing psychiatric conditions. Given the widespread impact of sleep disorders, including insomnia, on public health, understanding the factors that influence sleep quality is crucial for developing targeted interventions to improve sleep and overall health.[31]

In this cross-sectional study, we aimed to estimate the prevalence of insomnia and assess sleep quality among a sample of the general population in Saudi Arabia. Our findings revealed that insomnia is not highly prevalent in this population, with the majority of respondents reporting satisfaction with their current sleep patterns. However, a notable portion of participants experienced some degree of dissatisfaction, concern, or interference due to sleep problems. The demographic analysis showed a balanced representation across gender, age groups, regions, and income levels, providing a comprehensive insight into the socio-economic and health-related factors influencing sleep quality.

Additionally, the general health status of the respondents appeared to be favorable, with a significant percentage reporting "Very Good" or "Great" health and low levels of depression and anxiety. These results suggest that while insomnia may not be widespread, it remains a relevant issue for a subset of the population, particularly those with lower income levels or other risk factors. This overall analysis highlights the importance of addressing individual and social factors that may affect sleep quality and mental well-being in Saudi Arabia.

Our study found a significantly lower prevalence of insomnia among the Saudi population compared to previous studies conducted within the country. While our findings show a smaller percentage of respondents experiencing insomnia, previous studies have reported much higher rates. For instance, a study using the International Classification of Sleep Disorders, 2nd edition (ICSD-2), found that 77.7% of respondents experienced insomnia, and another study utilizing the Pittsburgh Sleep


https://doi.org/10.2147/NSS.S503297

Quality Index (PSQI) reported a 76.4% prevalence in Saudi primary care populations. Additionally, a study in the Aseer region using the Athens Insomnia Scale (AIS) reported a prevalence of 60.1%. The lower prevalence in our study may be attributed to differences in measurement tools, as well as the study population. Our study surveyed a broader, more general population, while previous studies focused on specific groups, which may have been at higher risk for insomnia.[14–16]

In comparison to our study, which found a lower prevalence of insomnia, with only a small fraction of respondents indicating dissatisfaction with their sleep patterns, a study conducted in Riyadh reported a significantly higher insomnia prevalence of 40% using DSM-5 criteria. The Riyadh study highlighted that insomnia was more prevalent in individuals aged 40–60 years (45.7%), smokers (60%), and obese individuals (54.1%). Additionally, the study found strong associations between insomnia and mental health conditions, such as anxiety (66.2%), depression (54%), and hypertension (58.5%). In contrast, our study found that the majority of respondents reported "Very Good" or "Great" health (65.3%) and low levels of depression (2.7%) and anxiety (1.0%). These differences could be attributed to the variation in the study populations and the tools used for assessment. Our study's population may have included a more diverse range of individuals with varying levels of health and stress, whereas the Riyadh study might have focused on specific risk groups, leading to higher insomnia prevalence.[32]

This study contributes valuable insights to the existing body of research on insomnia and sleep quality in Saudi Arabia by providing an updated prevalence estimate among a broader and more diverse population. Previous studies primarily focused on specific risk groups or used different measurement tools, leading to higher estimates of insomnia prevalence. By employing a representative sample of the general population and assessing various socio-economic factors, this study highlights a lower overall prevalence of insomnia (compared to previous research), while still identifying specific subgroups with higher risks of sleep disturbances. This finding underscores the importance of assessing sleep quality in a broader context, considering factors such as general health, depression, and anxiety. Moreover, it provides a baseline for future public health interventions that target sleep disorders in Saudi Arabia, particularly for those with socio-economic challenges or chronic health conditions.

Despite its valuable findings, this study has several limitations that should be acknowledged. First, the depend on phone interviews may have influenced the accuracy of self-reported data due to the lack of non-verbal cues and potential distractions during phone conversations. However, measures such as standardized interview protocols, automated data validation, and interviewer training were implemented to minimize bias and enhance reliability. Second, the brevity of phone-based surveys may limit the depth of responses compared to in-person interviews. While this trade-off was necessary to ensure high response rates and participant convenience, future studies could explore hybrid methodologies to validate these findings. Second, the use of self-reported questionnaires to assess sleep patterns may have introduced response bias, where participants could overestimate or underestimate their sleep satisfaction and health status. Additionally, the cross-sectional design of the study limits our ability to infer causal relationships between insomnia and the associated demographic and health factors.

Future research should aim to address the gaps identified in this study by incorporating longitudinal designs to establish causal relationships between insomnia and its associated risk factors. Research could also focus on investigating the effectiveness of various interventions, such as cognitive-behavioral therapy for insomnia (CBT-I) or pharmacological treatments, in reducing insomnia prevalence and improving sleep quality. Additionally, future studies should explore the impact of lifestyle factors such as diet, physical activity, and technology use (especially screen time) on sleep patterns in the Saudi population.

## Conclusion

In conclusion, this study provides important insights into the sleep quality and prevalence of insomnia among a diverse population in Saudi Arabia. While insomnia was not as prevalent in our sample as in previous studies, it remains a relevant issue for certain subgroups, particularly those with lower income levels or mental health concerns such as depression and anxiety. The findings underscore the need for targeted interventions that address the underlying social and health-related factors contributing to poor sleep. Additionally, the study highlights the importance of standardizing insomnia assessment tools and methodologies across studies to allow for better comparisons and more effective public health strategies. Ultimately, this research serves as a foundation for future studies that aim to improve sleep health and reduce the burden of insomnia in Saudi Arabia.

## Data Sharing Statement

The data used in this study were obtained from the Sharik Diet and Health Survey (SDHS) database and are not publicly available. However, access to the dataset may be granted upon reasonable request. Researchers interested in accessing the data should contact the Sharik Association for Research and Studies at info@sharikhealth.com.

## Ethics and Consent

This study received approval from the Ethics Committee of the Sharik Association for Health Research (Approval no. 06-2021) and was conducted in accordance with national research ethics guidelines. Verbal consent was obtained from all participants during phone interviews and was documented within the data collection system. No animal subjects were involved in this research.

## Author Contributions

Nasser F. BinDhim was responsible for conceptualization, methodology, formal analysis, investigation, supervision, and project administration. Mohammad Senitan contributed to methodology, investigation, writing—original draft preparation, and writing—review & editing. Nora A. Althumiri played a key role in data collection, formal analysis, and writing—review & editing. All authors have contributed meaningfully to this work, whether through the initial concept, study design, implementation, data collection, analysis, interpretation, or a combination of these areas. Furthermore, all authors have drafted or written, or substantially revised or critically reviewed the article, agreed on the journal to which the article will be submitted, reviewed and approved all versions of the article before submission, during revision, the final version accepted for publication, and any significant changes introduced at the proofing stage, and agree to take responsibility and be accountable for the contents of the article.

## Funding

This research received no external funding.

## Disclosure

The authors report no conflicts of interest in this work.

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