Disturbing dreams, nightmares, and psychological distress are predictors of poor sleep quality

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Summary. **Objective**: Up to 40% of adults report poor sleep quality, yet research investigating the role of nightmares on sleep quality is limited. This study aimed to characterise the prevalence of disturbing dreams and nightmares and their relationship to poor sleep quality. **Method**: 439 adults (310 females, M_{age}=44.9 years) completed an online survey investigating sleep, dreams, nightmares, and mental health. Validated questionnaires were administered, including the Pittsburgh Sleep Quality Index (PSQI), Disturbing Dreams and Nightmares Severity Index (DDNSI), and Depression Anxiety Stress Scale (DASS-21). Two linear regression models, adjusted for age and sex, examined the variance explained in PSQI scores by the DDNSI and DASS-21. **Results**: 22% of participants met the criteria for a potential nightmare disorder. Participants with a sleep or mental health disorder were more likely to report a nightmare disorder than participants without either condition. Disturbing dreams and nightmares significantly predicted PSQI scores ($\beta = 0.294$, $p < 0.001$), accounting for 8.7% of the variance. This effect remained significant even after including psychological distress in the analysis ($\beta = .051$, $p=.004$), with the combined influence of disturbing dreams, nightmares and psychological distress explaining 22% of the variance. **Conclusion**: Disturbing dreams and nightmares contribute to poor sleep quality, even after accounting for psychological distress. Our results show that a substantial proportion of adults (22%) may experience nightmares severe enough to meet the criteria for a potential nightmare disorder, putting them at risk of poorer sleep quality. Greater attention must be paid to disturbing dreams and nightmares when assessing sleep quality.

Keywords: Nightmares, psychological distress, PSQI, mental health, insomnia, sleep health

1. Introduction

Up to 40% of adults report experiencing poor sleep quality, increasing their risk of fatigue and impaired cognitive and physical performance (Hillman et al., 2018). Poor sleep quality directly and indirectly affects the economy, costing $AU66.3 billion annually in healthcare expenses, lost productivity, and safety incidents (Deloitte Access Economics, 2017). Sleep quality comprises four main attributes, including sleep efficiency, latency, duration, and wake after sleep onset, as well as an individual's satisfaction with all aspects of their sleep experience (e.g., subjective feelings about sleep, sleep depth, or restfulness) (Nelson et al., 2022). Many factors contribute to poor sleep quality, including lifestyle choices (e.g., bedtime procrastination, high caffeine and alcohol intake), mental health symptoms (e.g., depression, anxiety), as well as work-related factors such as shiftwork (Deloitte Access Economics, 2017; Hill et al., 2022; Scott et al., 2024). Additionally, with a prevalence rate of 22%, common sleep disorders such as insomnia, obstructive sleep apnoea (OSA), and restless legs syndrome also play a substantial role in poor sleep quality (Hillman et al., 2018).

Nightmares are one phenomenon that contributes to poor sleep quality, but they have been largely overlooked in sleep health research (Buysse et al., 1989). Nightmares are characterised by vivid dreams occurring during sleep with a negative or distressing emotional tone that can lead to nocturnal awakenings (American Psychiatric Association, 2013). In their most severe form, nightmares are recognised as a diagnosable sleep disorder. Nightmare disorder, according to the International Classification of Sleep Disorders, 3rd edition (ICSD-3), is a parasomnia involving frequent nightmares that involve threats to survival, security, or physical

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integrity that often result in a stressful awakening (Sateia, 2014). Nightmares can cause significant distress and lead to difficulties with social, occupational, or educational functioning (American Psychiatric Association, 2013). Nightmare disorder affects approximately 2-5% of the general adult population, with higher prevalence rates observed in those with mental health and sleep disorders (Blanchard et al., 2024; Dietch et al., 2021; Krakow, 2006; Rufino et al., 2024; Schredl, 2010a). The prevalence of frequent nightmares is also higher for females (4.4%) than males (2.9%) (Sandman et al., 2013). Despite the adverse effects of nightmare disorder on sleep quality, nightmares are rarely screened for in clinical practice or studied in population-based sleep health research (Gieselmann et al., 2019). For example, there was no mention of nightmare disorder in recent large-scale research into the cost of inadequate sleep and sleep disorders (Deloitte Access Economics, 2017; Hillman et al., 2018). Consequently, the contribution of nightmares to poor sleep quality is unclear.

While nightmares are rarely considered in general sleep health research, even subclinical nightmares and disturbing dreams (low to moderate symptoms) have been shown to relate to sleep quality. For example, self-reported sleep quality is associated with nightmare frequency, with higher nightmare frequency predicting poorer subjective sleep quality (Lancee et al., 2010). Further, the anticipatory anxiety associated with nightmares can exacerbate sleep disturbances (e.g., insomnia), creating a vicious cycle between disturbed sleep and distress (Delage et al., 2024; Lancee & Schrijnemaekers, 2013; Meaklim et al., 2023).

Nightmares, poor sleep quality, and psychological distress are strongly interrelated, with evidence suggesting both unidirectional and potentially bidirectional relationships. For example, Lancee and Schrijnemaekers (2013) found that experiencing a nightmare after controlling for sleep quality is independently associated with next-day distress. Whilst Stickgold & Manoach, 2017 hypothesised that nightmares are a failure of emotion regulation that can lead to distress the following day (Stickgold & Manoach, 2017). However, other dream research and theories suggest a more bidirectional relationship, where nightmares not only increase daytime distress but heightened distress during that day leads to more frequent or intense nightmares (Gieselmann et al., 2019; Hobson, 2013; Isaac et al., 2022; Nielsen & Levin, 2007; Slavish et al., 2022; Zadra et al., 2006).

Frequent nightmares are highly correlated with reduced psychological wellbeing, with nightmares forming part of the diagnostic criteria for mental health disorders such as post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2013; Zadra & Donderi, 2000). Sleep helps to attenuate the emotional salience and charge of an event, but in PTSD, memory processing during sleep is defective, leading to continued distressing memories of a traumatic event that can present as nightmares (Stickgold & Manoach, 2017; Zadra & Stickgold, 2021). Given that nightmares are related to reduced wellbeing, individuals with mental health disorders are at greater risk of nightmares, poorer sleep quality, and increased psychological distress.

Research on the impact of disturbing dreams and nightmares on sleep quality is notably limited. Small population-specific studies have been conducted, with nightmare prevalence rates ranging from 10% in university students (Elzo, 2011) to 91% in veterans with PTSD (Baird et al., 2018). Another study with a broader sample of adults revealed that those experiencing nightmares reported poorer sleep quality than those who had no bad dreams or nightmares (Weinberg et al., 2016). In this study, participants who had bad dreams and nightmares also reported higher stress and lower well-being than those without bad dreams or nightmares (Weinberg et al., 2016). Collectively, these studies indicate a potential high prevalence and substantial impact of disturbing dreams and nightmares on sleep quality. However, this has not been assessed in the general adult population.

Here, we explore the frequency of disturbing dreams and nightmares and their relationship to sleep quality. This study aimed to:

(i) Characterise the prevalence of disturbing dreams and nightmares.
(ii) Explore sex and age differences in reports of disturbing dreams and nightmares.
(iii) Examine differences in the frequency of disturbing dreams and nightmares between individuals with and without a diagnosed mental health disorder (e.g., depression, anxiety, PTSD) or sleep disorder (e.g., obstructive sleep apnoea, insomnia).
(iv) Determine the relationship between disturbing dreams and nightmares and sleep quality while also examining the contribution of psychological distress.

2. Materials and Methods

2.1. Experimental Design

A cross-sectional study explored disturbing dreams, nightmares, and sleep quality in adults. This study was part of a broader project investigating dreams, nightmares, sleep, insomnia symptoms, religious/spiritual practice, mental health, and death anxiety. The study required the completion of a 20-minute survey via REDCap (Research Electronic Data Capture). The survey instrument also obtained demographic information, including age, height, body mass, marital status, ethnicity, level of education, sleep disorder or mental health diagnosis. The survey was disseminated via social media (e.g., LinkedIn, Facebook, and Instagram), media outlets (e.g., local radio) and a website. Ethical approval for this project was granted (ref: 2023/ET000302), and the data were collected between May 2023 and February 2024.

2.2. Participants

Participants from the public were invited to participate in this study. The participant information sheet was made available upon accessing the survey via the study website survey link or QR code. Participants provided informed consent prior to any data being collected. The inclusion criteria were: 1) being 18 years of age and 2) residing in Australia. There were no exclusion criteria.

2.3. Research Instruments

2.3.1 The Disturbing Dream and Nightmare Severity Index (DDNSI)

The DDNSI is a five-item self-reported questionnaire measuring nightmare frequency, awakenings from nightmares (ranging from “never/rarely” [0] to “always” [4]), severity (ranging from “no problem” [0] to “extremely severe problem”), and intensity (ranging from “not intense” [0] to “extremely severe intensity” [6]) (Krakow et al., 2002). The index

score is calculated by summing the number of nightmares per week (up to 14), the number of nights with nightmares per week (0–7), the frequency of nightmare-related awakenings per night (0–4), ratings of the severity of the nightmares (0–6), and the intensity of the nightmares (0–6). The scoring scale is 0-14, with a score of >10 indicating a high probability of a nightmare disorder (Krakow et al., 2002). The internal consistency of the DDNSI in our sample was α = 0.89.

2.3.2 The Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a nine-item self-reported questionnaire on sleep quality whereby participants reflect on the last month and answer items on sleep quality, latency, duration, efficiency, disturbances, use of sleep medication, and daytime function (Buysse et al., 1989). Each item is scored on a 0-3 scale, with some items added to a component score, which is again scored on a 0-3 scale. A total score is created by the sum of all seven component scores. The global score ranges between 0 and 21, with 0 indicating no difficulty and 21 indicating severe difficulties in all areas. A score >5 indicates poor sleep quality (Buysse et al., 1989). The internal consistency of the PSQI global score in our sample was α = 0.65.

2.3.3 The Depression Anxiety Stress-21 Scale

The Depression Anxiety Stress Scales - 21 Items (DASS-21) is a self-report questionnaire designed to measure the psychological states of depression, anxiety, and stress (Lovibond & Lovibond, 1995). The DASS-21 consists of 21 items, with each item rated on a 4-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"). Participants are asked to indicate the extent to which each statement applied to them over the past week. For this study, we utilised the total DASS-21 score, which provides a comprehensive measure of overall psychological distress. Psychological distress is often used as an indicator of mental health in adults. The total DASS-21 score is computed by summing the scores of all 21 items, resulting in a total score range from 0 to 63 (Evans et al., 2020). Higher DASS-21 total scores indicate greater levels of psychological distress. DASS-21 total scores have excellent internal consistency in adults (α =.97) (Crawford & Henry, 2003). The internal consistency of the DASS-21 total score in our sample was α = 0.91.

2.4. Statistical Analysis

All statistical analyses were performed using Python (version 3). Descriptive statistics were used to report participant demographic characteristics. Continuous variables were reported as means and standard deviations (SDs). Categorical variables were presented as frequencies and percentages. Participants were categorised into age groups: 18 – 30 years, 31 – 40 years, 45 – 59 years, 60 – 74 years and over 75 years. Internal consistency was determined for each measure by calculating the Cronbach Alpha value. Sex differences were assessed by independent t-tests (continuous variables) and chi-squared tests (categorical variables). A

Table 1. Participant Demographics.

Item	Totals (n = 439)	Male (n = 129)	Female (n = 310)	95% CI	Cohen's d	P value
Age	44.90 ± 17.68	48.30 ± 14.87	43.54 ± 18.54	1.41, 8.11	0.27	.006
Body mass	75.46 ± 18.18	85.53 ± 15.50	71.23 ± 17.57	10.91, 17.72	0.84	< .001
Height	169.62 ± 9.77	178.83 ± 8.15	165.75 ± 7.56	11.36, 14.71	1.68	< .001
BMI	26.17 ± 5.64	26.70 ± 4.27	25.95 ± 6.12	-0.28, 1.79	0.13	.151
Sleep disorder diagnosis				-	-	.287
Yes	46 (11%)	17 (13%)	29 (9%)			
No	390 (89%)	110 (85%)	280 (90%)			
Unknown	3 (1%)	2 (2%)	1 (0%)			
Mental health diagnosis				-	-	.063
Yes	209 (48%)	52 (40%)	157 (51%)			
No	224 (51%)	75 (58%)	149 (48%)			
Unknown	6 (1%)	2 (2%)	4 (1%)			
Marital status				-	-	.108
Married	199 (45%)	70 (54%)	129 (42%)			
Defacto	97 (22%)	24 (19%)	73 (24%)			
Single	107 (24%)	25 (19%)	82 (26%)			
Divorced	33 (8%)	10 (8%)	23 (7%)			
Ethnicity				-	-	.225
Caucasian	361	111	250			
Non-Caucasian	78	18	60			
Education level				-	-	.922
Trade certificate/diploma	72 (16%)	22 (17%)	50 (16%)			
Undergraduate university degree	145 (33%)	42 (33%)	103 (33%)			
Postgraduate university degree	168 (38%)	49 (38%)	119 (38%)			
Did not complete High School	14 (3%)	3 (2%)	11 (4%)			
Completed high school	38 (9%)	13 (10%)	25 (8%)			

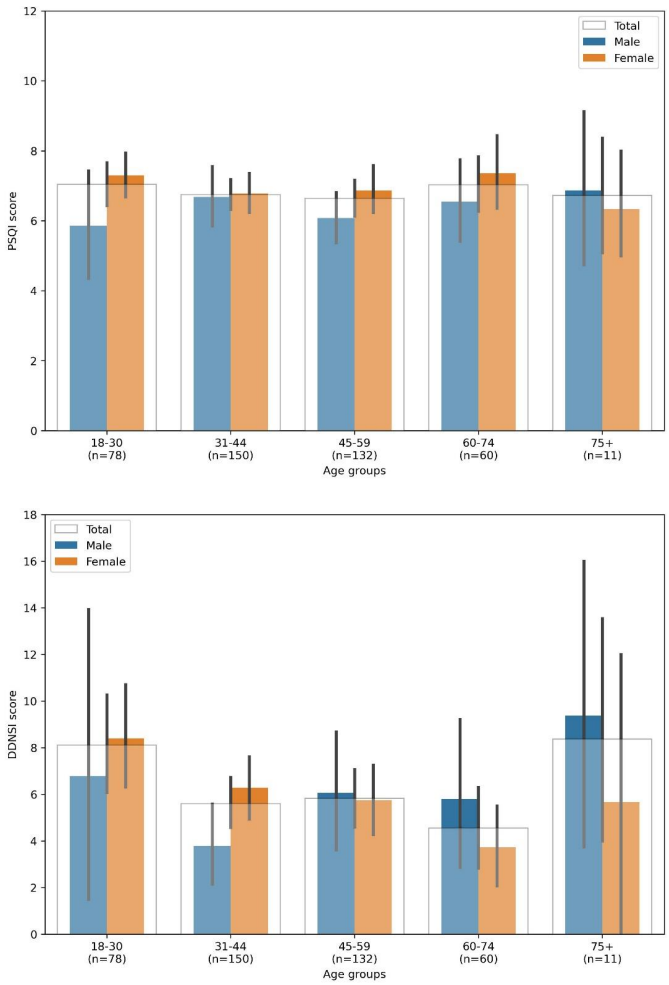

Figure 1. Sleep quality, disturbing dreams and nightmares across age and sex.
Note. PSQI = Pitsburgh Sleep Quality Index; DDNSI = Disturbing Dreams and Nightmares Severity Index

two-way analysis of variance (ANOVA) was used to explore variance between age and sex categories, with post-hoc testing performed when statistical significance was found. Independent t-tests were performed to determine differences in sleep quality and nightmare severity between people with and without a mental health or sleep disorder. To investigate the relationship between disturbing dreams and nightmares (DDNSI), psychological distress (total DASS-21) and sleep quality (PSQI), we used a series of linear regressions (adjusted for age and sex). Statistical significance was set to p <.05.

3. Results

3.1. Participant demographics

Data from 439 adult participants (310 female) were included in the study. Participant demographics and comparisons between sexes are summarised in Table 1. In this study, 48% of participants self-reported a mental health diagnosis, with a higher prevalence in females (51%) compared to males (40%); however, this difference was not statistically significant (p = .063). Additionally, 11% of participants reported a diagnosed sleep disorder, with no differences in prevalence between females and males (p = .287).

When analysing and comparing the mean scores of PSQI and DDNSI scores across age and sex groups, there were no differences in sleep quality or disturbing dreams and nightmare scores between males and females in any age or sex group (all p's >.05; see Figure 1).

3.2. Estimated prevalence of nightmare disorder in this sample

Twenty-two percent of participants met the criteria for a potential nightmare disorder, representing a substantially higher figure than the estimated general population prevalence of 2-5% (Dietch et al., 2021; Krakow, 2006; Rufino et al., 2024).

3.3. Sleep disorder diagnosis and its relationship to sleep quality and nightmares

The most common sleep disorder diagnoses reported by participants were OSA (n = 18; 4%), insomnia (n = 11; 3%), and central disorders of hypersomnolence (n = 9; 2%). There was no significant difference in PSQI scores between participants who self-reported a diagnosed sleep disorder (9.61 ± 3.12) and those without a sleep disorder (6.70 ± 2.90; p = .066, d= 0.31). However, those with a sleep disorder reported significantly higher DDNSI scores (9.20 ± 9.40) than those without a sleep disorder (5.68 ± 7.51; p = .018, d= 0.45). This resulted in 37%

Table 2. Regression analysis examining the impact of Disturbing Dreams and Nightmares (DDNSI) and Psychological Distress (DASS-21) on Sleep Quality (PSQI).

Model	Variable	β	SE B	p-value	95% CI
1	Disturbing Dreams and Nightmares (DDNSI)	0.294	0.047	< 0.001	0.202, 0.387
2	Disturbing Dreams and Nightmares (DDNSI)	0.0512	0.018	0.004	0.016, 0.086
	Psychological Distress (DASS-21)	0.0970	0.011	< 0.001	0.075, 0.119

n = 17) of people with a sleep disorder potentially also having a nightmare disorder, compared to 20% (n = 79) in those without a sleep disorder.

3.4. Mental health diagnosis and its relationship to sleep quality and nightmares

The most common mental health diagnoses reported by participants were: 1) anxiety disorders (*n* = 70; 16%); 2) depressive disorders (*n* = 50; 11%); 3) trauma and stressor-related disorders (e.g., PTSD; *n* = 32; 7%); 4) developmental disorders such as autism and ADHD (*n* = 26; 6%), and 5) bipolar disorder (*n* = 5; 1%). Participants who self-reported a mental health disorder diagnosis had significantly higher PSQI scores (7.67± 3.07) compared to those without a mental health disorder diagnosis (6.04 ± 2.61; *p* <.001, *d*= 0.57). Similarly, DDNSI scores were significantly higher for those with a mental health diagnosis (8.72 ± 8.59) compared to those without a diagnosis (3.70 ± 6.09; *p* <.001, *d*= 0.68). This resulted in 34% (*n* = 70) of people with a mental health disorder potentially also having a nightmare disorder, compared to 12% (*n* = 26) in those without a mental health disorder.

3.5. Impact of disturbing dreams, nightmares, and psychological distress on sleep quality

A regression analysis examined the impact of disturbing dreams and nightmares on sleep quality, adjusted for age and sex (see Table 2, Model 1). DDNSI scores significantly predicted PSQI scores, with higher DDNSI scores related to poorer sleep quality. The Adjusted R^2 for this regression model was 0.087, indicating that DDNSI scores accounted for 8.7% of the variance in PSQI scores in this study. In a second regression analysis, we included psychological distress as measured by total DASS-21 scores (adjusted for age and sex; see Table 2, Model 2). Both disturbing dreams and nightmares and total distress scores significantly predicted PSQI scores (all p's <.004). The Adjusted R^2 for this model was 0.222, indicating that DDSNI and Total DASS-21 scores accounted for 22% of the variance in PSQI scores.

4. Discussion

This study explored the relationship between disturbing dreams and nightmares, psychological distress, and poor sleep quality in a general adult sample. Regression analysis demonstrated that disturbing dreams and nightmares significantly predict poor sleep quality. Disturbing dreams and nightmares accounted for 8.7% of the variance in sleep quality scores. The combined influence of disturbing dreams, nightmares, and psychological distress on sleep quality scores increased to 22%. Participants in our study reported a high occurrence of potential nightmare disorder (22%). We also observed a higher rate of disturbing dreams and nightmares in individuals who self-reported a sleep disorder or mental health disorder diagnosis than those without a diagnosis. Small sex and age differences in disturbing dreams and nightmares were noted; however, these were not statistically significant. Our findings suggest that disturbing dreams and nightmares are common and are associated with poor sleep quality.

Prevalence of disturbing dreams and nightmares

Despite rarely screening for nightmares in sleep health research, our study suggests disturbing dreams and nightmares are prevalent in the population. We found that 22% of participants met the criteria for a potential nightmare disorder, which is significantly higher than the estimated population prevalence rates of 2-5% (Blanchard et al., 2024; Dietch et al., 2021; Krakow, 2006; Rufino et al., 2024; Schredl, 2010a). The high prevalence rate of potential nightmare disorder may be related to our method of survey sampling, with our study advertisement openly disclosing that the survey was about dreams and sleep. Thus, this high prevalence rate may be partially explained by sampling bias. Our work, however, highlights the need for more comprehensive population sampling methods to determine accurate prevalence rates of nightmare disorder in adults.

Whilst we did not see much variation in sleep quality scores across age groups, we did observe slight differences in disturbing dreams and nightmares scores across age and sex groups. Younger adults (18-30 years) and older adults (over 75 years) were more likely to report higher DDNSI scores than middle-aged adults (31-74 years), although this difference did not reach statistical significance. Whilst past research supports a higher frequency of disturbing dreams and nightmares in women than men, no differences were observed in our sample (Li et al., 2010; Sandman et al., 2013). Future research using robust population sampling methods will help to elucidate whether there are definite age and sex differences in disturbing dreams and nightmares in adults.

Disturbing dreams and nightmares in individuals with a sleep or mental health disorder.

Overall, we found higher rates of disturbing dreams and nightmares amongst participants who self-reported a sleep disorder diagnosis. For example, 37% of people with a self-reported sleep disorder scored consistently with having a potential nightmare disorder, compared to only 20% of those without a sleep disorder. Higher recall of nightmares in sleep disorders may be due to disruptions in sleep continuity (Delage et al., 2024; Li et al., 2010). For example, individuals with insomnia may be more likely to awaken after a nightmare and ruminate on the nightmare experience due to having difficulty returning to sleep (Meaklim et al., 2023).

This may lead to heightened dream recall frequency. A similar process may be at play in OSA, with respiratory events contributing to frequent awakenings and heightened dream recall (Li et al., 2010). However, not all studies support the relationship between increased nightmare frequency in OSA (Hicks & Bautista, 1993; Schredl et al., 2006). Further research incorporating polysomnography and clinical interviews to determine sleep disorder diagnoses is needed to explore further the high occurrence of nightmares in individuals with a range of sleep disorders.

Similarly, our study demonstrates a relationship between nightmares and mental health disorders. Past research has consistently established an association between nightmares and mental health disorders, such as depression, anxiety and PTSD (Li et al., 2010; Stickgold & Manoach, 2017; Zadra & Stickgold, 2021). In the current study, 34% of people with a mental health disorder (predominantly anxiety, depression, and PTSD) were suspected of having a nightmare disorder, compared to only 12% of those without a mental health disorder. As mentioned previously, nightmares can exacerbate psychological symptoms and contribute to overall distress and daytime impairments via a bidirectional relationship (Blanchard et al., 2024; Lancee & Schrijnemaekers, 2013; Zadra & Donderi, 2000). Further, the severity and frequency of nightmares are related to higher levels of psychological distress (Kennedy et al., 2022; Zadra & Donderi, 2000). Our study adds support to the strong link between mental health conditions and nightmares and aligns with the mechanistic hypothesis that nightmare-affected sleep contributes to psychological dysregulation. One important limitation of our research is the high prevalence of self-reported mental health disorders in our study. Forty-eight percent of our participants reported having received a mental health diagnosis in their lifetime, much higher than the 20% population prevalence rate (Australian Bureau of Statistics). Therefore, our sample may represent a group with higher rates of both mental health and nightmare disorder diagnoses than the general population.

Impact of disturbing dreams, nightmares, and psychological distress on sleep quality

Our results demonstrated that both disturbing dreams and nightmares and psychological distress independently explained significant variance in sleep quality. Our findings highlight that both nightmares and psychological distress are critical factors affecting sleep quality. The current results, whilst only cross-sectional, suggest that psychological distress may result in more disturbing dreams, nightmares, and, consequently, poorer sleep quality. Whilst not directly assessed in this study, a bidirectional relationship between nightmares, poor sleep quality, and distress may be at play and explained by the activation, input-output, and modulation (AIM) model of dreaming (Hobson, 2013; Hobson et al., 2000). The AIM model theorises that dreams result from an interplay between activation, input-output gating and modulation in the brain. Higher levels of distress are also strongly associated with the sleep disorder, insomnia, with frequent awakenings from nightmares, worsening insomnia symptoms and heightening dream recall (Delage et al., 2024; Meaklim et al., 2023). Given our results regarding the influence of nightmares and psychological distress on sleep quality, future research should explore the potential bidirectional relationships between disturbing dreams and nightmares, psychological distress, and insomnia by investigating temporal relationships.

Public sleep health opportunities in dreams and nightmares

Sleep health research has rarely considered the impact of nightmares on sleep quality. However, focusing on dreams and nightmares appears to be a valuable means of engaging the community in sleep health conversations. Research on dreams and nightmares often receives significant media attention, as it is a topic of genuine interest for the public (e.g., Zadra and Stickgold (2021)). However, the sleep health field has, at times, viewed dream and nightmare research as 'less scientific' due to the subjective nature of dream reports than other sleep research topics (e.g., OSA, insomnia) (Foulkes, 1996; Ruby, 2011; Scarpelli et al., 2022). Despite this, current trends in the literature highlight the growing attention awarded to the topic of dreams and nightmares (Zadra & Stickgold, 2021). For example, there has been a surge in dream and nightmare research and public interest since the COVID-19 pandemic (Barrett, 2020; Kennedy et al., 2022; Meaklim et al., 2023; Scarpelli et al., 2021; Solomonova et al., 2021). The uncertainty of the pandemic led to an increase in population distress and mental health symptoms (e.g., anxiety and stress), which in turn was associated with a rise in disturbing dreams and nightmares (Fränkl et al., 2021; Meaklim et al., 2023; Morin et al., 2021; Pierce et al., 2020). Media reports on vivid dreaming were prolific during the pandemic, with print and radio segments on dreams and nightmares during COVID-19 (Jarvis, 2021; Nielsen, 2020; Renner, 2020). The recent pandemic literature has emphasised the high prevalence of nightmares during stressful times and demonstrated a need to quantify the impact of disturbing dreams and nightmares on sleep quality beyond the pandemic. Our research also highlights the need for sleep health and psychology researchers to include dreams and nightmares in current research to capture public interest in sleep health.

5. Clinical implications

Disturbing dreams and nightmares are not often assessed clinically. Our research suggests that sleep clinicians and psychologists should routinely ask patients about their experience with disturbing dreams and nightmares and investigate whether they may be contributing to their patient's experience of poor sleep quality. This will help to understand a patient's complete subjective experience of sleep quality. Evidence-based therapies to address nightmares are now available and practical (e.g., Imagery Rehearsal Therapy (Krakow & Zadra, 2006; Morgenthaler et al., 2018). Sleep clinicians and psychologists should ensure they are well-skilled in these psychological and behavioural approaches to treat nightmares, as nightmares are notoriously undertreated in clinical practice (Krakow & Zadra, 2006; Morgenthaler et al., 2018; Schredl, 2010b).

6. Limitations

One limitation of our study is the use of convenience sampling. We openly advertised that our study was investigating dreams and sleep. Therefore, we likely had a higher response rate from people with a keen interest in dreams and/or sleep difficulties than the general population. However,

we did not advertise that we were exploring the connection between nightmares and mental health disorders, but we had a high response rate from people experiencing mental health disorders. Our results should be interpreted in light of these limitations. We recommend that future research conduct more thorough population sampling methods to ensure accurate estimates of disturbing dreams and nightmares in the general population.

A second limitation is the cross-sectional nature of the current study, which limits the conclusions that can be drawn regarding causality. For example, whilst the current findings may indicate that psychological distress leads to poor sleep quality, it is equally possible that the causal direction is reversed. Poor sleep quality may also increase psychological distress by impeding emotion regulation and heightening emotional vulnerability and reactivity. Examining the causal direction was beyond the scope of the current cross-sectional study. However, the current findings at least support the strong relationships between nightmares, psychological distress, and poor sleep quality and are consistent with theoretical predictions from the AIM model (Hobson, 2013; Hobson et al., 2000). Future research would benefit from using repeated assessment points, such as through longitudinal designs or ecological momentary assessment (EMA), to further clarify the causal directions of the variables explored in the current study.

7. Conclusion

Our study highlights the impact of disturbing dreams and nightmares on poor sleep quality in adults. It also demonstrates the contribution of psychological distress to poor sleep quality and the nightmare experience. We found a higher prevalence of potential nightmare disorder in our sample than the average global prevalence rate, highlighting a need for a more rigorous population sample in future dream and nightmare research. The implications of our findings include the need for more clinical attention and research into the impact of dreams and nightmares on sleep health.

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Data availability

The article's data will be shared on reasonable request to the corresponding author.

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