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Exploring the Links Between Dream Experience, Nightmares, Sleep-Related Disturbances, and Subjective Well-Being

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Abstract: The purpose of this study was to investigate the relationship between the subjective experience of dreams, anxiety, and depressive symptoms. Specifically, the study aimed to explore whether the subjective experience of dreams, including how often dreams are remembered, the presence of nightmares, and the way in which a person thinks about dreams, could influence the occurrence of subjective state and trait anxiety, as well as depression. Nightmares, a subset of dreams characterized by high distress and negative tone, were of particular interest, as they can significantly impact a person's well-being and contribute to anxiety and depression. The study also examined the possible influence of recent stress, as well as sleep-related disturbances such as insomnia, difficulty falling asleep, and nocturnal awakenings. A national online survey using Qualtrics forms was utilized to collect the data. The study involved 431 participants (124 males). All participants completed the DQ scale, a questionnaire with a three-factor structure: *dream recall*, *nightmare distress*, and *dream meaning*; the STAI Form Y1-Y2 and the BDI-II. Overall, results suggests that the presence of nightmares is associated with higher levels of depressive distress and increased intensity of both *state* and *trait* anxiety. Additionally, the findings indicate that depression is more severe in individuals experiencing recent stress, difficulty falling asleep, and frequent awakenings during the night. Even stable anxious traits of an individual appear to be more intense and contribute to frequent awakenings during the night. The frequency of nightmares is also linked to stress, overexertion, difficulty falling asleep, and frequent awakenings during the night. Interestingly, the memory of dreams is also related to the level of stress experienced by individuals, with those experiencing recent stress tending to recall their dreams more often. Present results are of clear clinical significance providing insight into possible treatment opportunities. Future studies should aim to utilize more representative sample, including different psychiatric populations and individuals with various sleep disorders, to further explore these associations.

Keywords: Dreams Experiences, Depression, Anxiety, Stress, Sleep Disturbances

1. Introduction

Dreams have long been a subject of fascination for humans and a topic of study for psychologists and neuroscientists for many decades. Despite ongoing research, the precise mechanisms underlying dream formation, function and utility remain unclear. Several theories have been proposed, including classical Freud's notion that dreams reflect unconscious psychological processes, the Activation-Synthesis theory which posits that dreams are the brain's attempt to make sense of random neural activity during sleep, and the Threat Simulation theory, which suggests that dreaming evolved as a way for the brain to prepare for potential threats in the environment [1-4].

Nonetheless, a growing body of research has identified links between dreaming and several cognitive processes, such as memory consolidation, attention, and emotional regulation [5-10]. Research proposes that dreams may also play a role in

problem-solving and creativity [11-13]. Additionally, in several studies it has been suggested that dreams serve as a coping mechanism, providing an opportunity to process and manage difficult emotions and anxiety-provoking situations in a safe environment [14-17]. Research have also explored the content of dreams, which can exhibit considerable variability, ranging from mundane and routine experiences to vivid and fanciful scenarios. While some dreams may be pleasant and enjoyable, others can be distressing and cause emotional discomfort. Numerous studies have reported that dream content can influence the intensity and duration of subsequent mood state and the ability to deal with problems in daily life while awake [18-20]. For example, people who had negative dreams tended to experience more negative affect during the following day compared to those who had positive or neutral dreams [21].

Nightmares, among dreams, have received considerable attention in the literature due to their potential impact on mental health and wellbeing [22-24]. They are characterized by high distress and negative tone and are extremely terrifying, disturbing, very vivid, realistic, and they often lean to wake a person up from their sleep. Research has consistently shown that frequent nightmares can lead to increased anxiety throughout the day, affecting a person's wake-life [15]. Moreover, individuals often experiencing distressing dreams and nightmares are more likely to exhibit symptoms of depression, anxiety, and post-traumatic stress disorder (PTSD) [25-31] with studies showing that there is a connection between the experiencing and recall of dreaming, nightmares, and the subjective wellness. Numerous studies have examined how dreaming, including nightmares, may function as a means of emotion regulation during periods of stress, serving to manage reactive anxiety. However, it remains unclear whether this strategy applies solely to situational anxiety or also extends to individuals with stable anxious traits.

The study of dreams and nightmares also affects sleep research. As dreams occur during the rapid eye movement (REM) stage of sleep, they can affect the quality and duration of sleep. Individuals who experience distressful nightmares may also experience sleep disturbances, such as difficulty falling or staying asleep, and reduced sleep quality [32], insomnia and sleep apnea [33, 34]. This can lead to daytime fatigue, impaired cognitive function, and reduced overall quality of life.

Therefore, the present study aimed to investigate the relationship between, subjective experience of oneiric activity, anxiety (both as a transient state and as a stable trait), and depressive symptoms, in a non-clinical population, using three validated tools: the Dream Questionnaire [35], the State-Trait Anxiety Inventory [36, 37], and the Beck Depression Inventory [38]. Specifically, the study aimed to explore the subjective experience of dreams, including how often dreams are remembered, occurrence of nightmares and relative distress, and the relevance that a person might give to their own personal dreams along with the way in which a person thinks about their dreaming life is related to their wake life, and whether this subjective experience could influence the incidence of subjective state and trait anxiety, as well as the amount of depression. Nightmares were of

particular interest, given their potential impact on individual's quality of life, triggering emotional distress, impaired sleep, and reduced daytime satisfaction.

The present study also investigated the potential influence on dreaming of recent stress, as well as sleep-related disturbances such as insomnia, difficulty falling asleep, and nocturnal awakenings.

2. Method

2.1. Procedure and Participants

Ethical approval for the study was obtained by the Ethical Committee of the University of Bologna. A national anonymous online survey implemented with Qualtrics Forms and shared on several social media was utilized to collect the data. Each participant completed the survey after reading the informed consent form and declaring the explicit agreement to participate in the research.

Using a snowball sampling approach, a total of 431 participants were involved in the study (124 males). The overall mean age of the sample was 35.36 (SD=14.40), with females having a slightly lower mean age of 34.94 (SD=14.35) and males having a slightly higher mean age of 36.42 (SD=14.54). Most of the participants had received higher education with 215 with a degree/para-university diploma (mean age=32.59, SD=12.06) and 164 with upper secondary school/vocational technical institute (mean age=35.33, SD=15.47), while 31 had obtained a doctorate/postgraduate specialization; just 21 subjects were from lower secondary school (mean age=47.86, SD=15.87). Most of the participants were single (252; males=82) or married (138; males=4), while a small part was cohabiting, separated, or divorced (10; males=2).

2.2. Measures

All participants completed three well-validated tools in current literature. The Dream Questionnaire (DQ) [35], which is a 14-item self-reporting 5-point Likert-scale questionnaire with a three-factor structure in order to assess different dreaming features that past studies suggest were relevant such as the *dream recall* factor (e.g., "I often record my dreams"), the *nightmare distress* factor (e.g., "Many of my nightmares are recurrent one"), and the *dream meaning* factor (e.g., "My dreams often help me to identify and solve my problems"). Subjective anxiety was assessed using the Italian version of the Spielberger State-Trait Anxiety Inventory for adults (STAI; Form Y1 and Y2) [36, 37], a well-known anxiety self-evaluation questionnaire including 40 items on a 4-point Likert scale ranging from 1=strongly disagree to 4=strongly agree, grouped into two different 20-item forms: one measuring trait-like anxiety (Y2) and the second measuring state-like anxiety scale (Y1); the Beck Depression Inventory-II (BDI-II) [38] was administered to assess depressive symptoms.

Descriptive statistics for sociodemographic characteristics and general clinical information, along with sleep habits, were collected through a brief questionnaire in a categorical

scheme that only included two levels (yes/no format).

Descriptive analysis has shown significant differences between males and females on all the three scales of the DQ (F (3,318) =6,353; p=.000; Partial Eta Squared=.057), with females reporting consistently more high scores compared to males' participants (see table 1). We did not take gender into consideration in subsequent analyses and retained this information at a descriptive level, as we did not use the DQ scales as dependent variables in the Regression Analyses. No significant gender differences were found for the anxiety *trait* and *state* scales, as well as for depression scores. Therefore, gender was not considered in the subsequent analysis. Results from multivariate analysis of variance and descriptive statistics for all the measures used is reported in Table 1.

Table 1. *Mean and standard deviation and results from multivariate analysis of variance for males and females for DQ scale, STAI-Y1 and Y2 and BDI-II.*

		Mean (SD)	F (1.239)	p	Par. Eta^2
DQ-recall	*Male*	11.86 (.270)	7.68	.006	.023
	Female	12.74 (.163)			
	Total	12.5 (2.526)			
DQ-nightmare	*Male*	11.38 (.483)	13.204	.000	.04
	Female	13.43 (.291)			
	Total	12.89 (4.560)			
DQ-meaning	*Male*	10.55 (.302)	11.27	.001	.034
	Female	11.73 (182)			
	Total	11.41 (2.841)			
BDI-II	*Male*	31.33 (.922)	2.23	.137	.007
	Female	32.94 (.557)			
	Total	32.506 (8.518)			
STAI-State	*Male*	55.932 (.748)	3.013	.083	.008
	Female	55.174 (.453)			
	Total	55.476 (7.655)			
STAI-Trait	*Male*	55.922 (.865)	.715	.390	.002
	Female	54.167 (.524)			
	Total	54.638 (8.801)			

Note: DQ=Dream Questionnaire; Par. Eta^2= Partial Eta Squared

3. Analysis and Results

3.1. Relation Between Dreams Experience and Depression and Anxiety

Analyses were performed using SPSS (version 25.0 for Windows, SPSS Inc., Chicago, IL, USA). Two different Multivariate Regression Analysis have been conducted by means of General Linear Model (GLM) procedure, to examine if the DQ questionnaire and its subscales would be predictive of depressive scores and anxiety *trait* and *state* scores, respectively.

The first regression analysis revealed that the *nightmare* subscale of the DQ was a significant predictor of BDI-II scores (F(1,314)=39.326; p=.000; Par.Eta^2=.111). As the frequency of nightmares increased, BDI scores also tended to increase. However, the *recall* (p=.650) and *meaning* (p=.885) subscales of the DQ did not significantly predict BDI-II scores (see table 2 and figure 1).
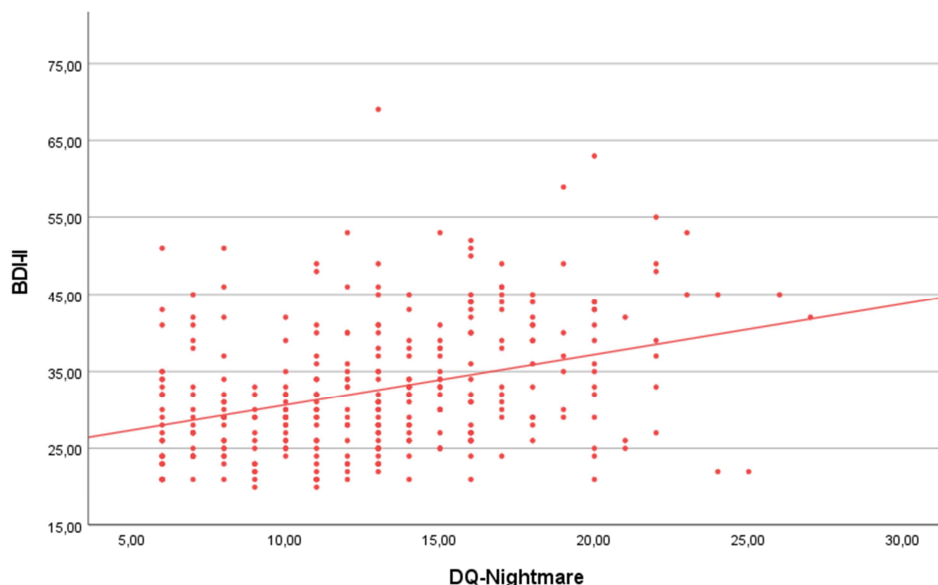
Figure 1. *Scatterplots representing the positive relation between the nightmare subscale score of the Dream Questionnaire and the BDI-II score.*

Table 2. *Results of regressions analysis, considering the Dreaming Questionnaire subscales as predictors and the BDI-II score as dependent variable. Significant results are indicated in bold.*

|	B (SE)	T	p	Par. Eta^2
DQ-recall	-,135 (.201)	-,669	,504	,001
DQ-nightmare	,681 (.109)	6,271	,000	,111
DQ-meaning	,010 (.180)	,057	,955	,001

Note: DQ=Dream Questionnaire; Par. Eta^2= Partial Eta Squared

In the second regression analysis, the *nightmare* subscale of the DQ was found to be a significant predictor of both *state* anxiety ($F_{(1,317)}$= 4.849; p=.028; p.eta2=.015) and *trait* anxiety ($F_{(1.317)}$= 4.382; p=.014; p.eta2=.014) scores of the STAI-Y. As the frequency of nightmares increased, both state and trait anxiety scores tended to increase. The *recall* (p=.467 and p=.646, *state* and *trait* respectively) and *meaning* (p=.525 and p=.498, *state* and *trait* respectively) subscales of the DQ were not significant predictors of anxiety scores see table 3 (see table 3, figure 2 and figure 3).

Table 3. *Results of regressions analysis, considering the Dreaming Questionnaire subscales as predictors and the STAY state and trait score as dependent variables. Significant results are indicated in bold.*

		B (SE)	T	p	Par. Eta^2
STAI-State	*DQ-recall*	-,088 (.120)	-,728	,467	,002
	DQ-nightmare	,143 (.065)	2,202	,028	,015
	DQ-meaning	,069 (.108)	,636	,525	,001
STAI-Trait	*DQ-recall*	-,057 (.123)	-,459	,646	,001
	DQ-nightmare	,140 (.067)	2,093	,037	,014
	DQ-meaning	-,075 (.111)	-,678	,498	,001

Note: DQ=Dream Questionnaire; Par. Eta^2= Partial Eta Squared
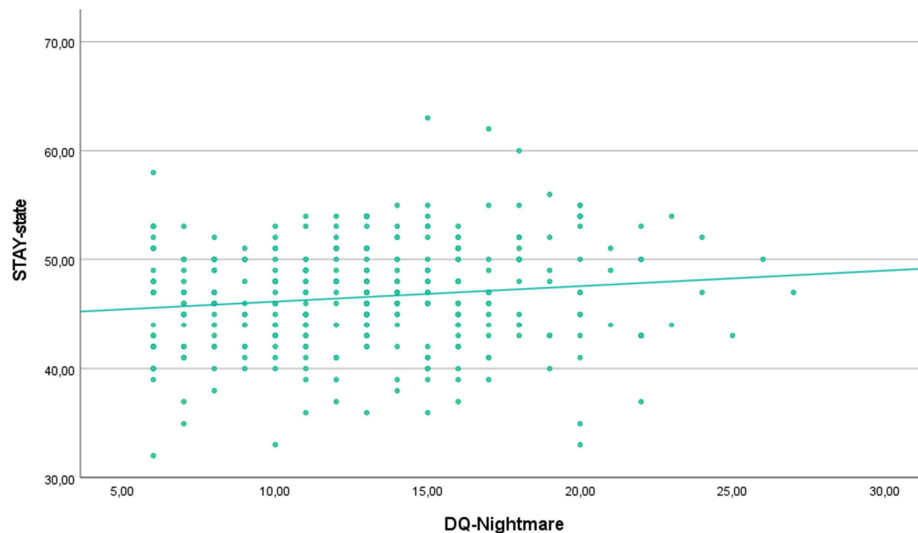
Figure 2. *Scatterplots representing the positive relation between the nightmare subscale score of the Dream Questionnaire and the STAY-state score.*
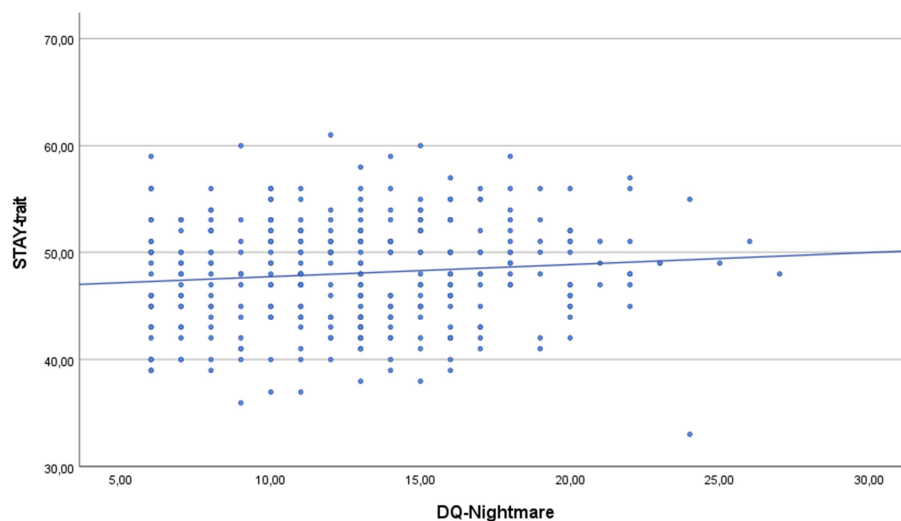
Figure 3. *Scatterplots representing the positive relation between the nightmare subscale score of the Dream Questionnaire and the STAY-trait score.*

3.2. Relation Between Dreams Experience and Presence of Recent Stress and Sleep-Related Disturbances

A series of Multivariate Analysis of Variance have been conducted by means of General Linear Model (GLM) procedure, to examine if the DQ questionnaire and its subscales would be predictive of stress, insomnia, difficulty in falling asleep, and frequent awakening during the night.

Regarding the presence of stress, significant differences were found between individuals who recently experienced severe stress and those who did not ($F_{(6.233)}$= 3.795; p=.001; p.eta2=.089). Significant differences were found between the two groups for the *recall* and *nightmare* subscales of the DQ and for BDI-II scores. Those who recently experienced severe stress tended to remember dreams more, have more nightmares, and exhibit higher BDI-II scores (see table 4).

Table 4. *Results of Multivariate analysis of Variance, considering the presence/absence of stress as independent variable and the Dreaming Questionnaire subscales, STAY state and trait and BDI-II as dependent variables. Significant results are indicated in bold.*

			Mean (SD)	F (1.239)	p	Par. Eta²
Stress	DQ-*recall*	Yes	13,229 (.333)	4,466	,036	,018
		No	12,443 (.166)			
	DQ-*nightmare*	Yes	14,458 (.643)	7,338	,007	,030
		No	12,510 (.322)			
	DQ-*meaning*	Yes	11,250 (.394)	,590	,443	,002
		No	11,589 (.197)			
	BDI-II	Yes	35,292 (1.143)	10,664	,001	,043
		No	31,120 (.571)			
	STAI-*State*	Yes	55,000 (.678)	,417	,519	,002
		No	54,510 (.339)			
	STAI-*Trait*	Yes	52,271 (.717)	1,247	,265	,005
		No	53,167 (.359)			

Note: DQ=Dream Questionnaire; Par. Eta²= Partial Eta Squared

Significant differences were also found between individuals with insomnia and those without ($F_{(6.234)}$= 5.667; p<.001; p.eta2=.127) for the *nightmare* subscale of the DQ and BDI-II scores. Those with insomnia tended to have more nightmares and higher BDI-II scores (see table 5).

Table 5. *Results of Multivariate analysis of Variance, considering the presence/absence of insomnia as independent variable and the Dreaming Questionnaire subscales, STAY state and trait and BDI-II as dependent variables. Significant results are indicated in bold.*

			Mean (SD)	F (1.239)	p	Par. Eta²
Insomnia	DQ-*recall*	Yes	12,667 (.347)	,061	,805	,001
		No	12,571 (.166)			
	DQ-*nightmare*	Yes	14,511 (.665)	7,435	,007	,030
		No	12,500 (.319)			
	DQ-*meaning*	Yes	11,533 (.407)	,002	,968	,001
		No	11,515 (195)			
	BDI-II	Yes	37,622 (1.133)	30,769	,000	,114
		No	30,653 (.543)			
	STAI-*State*	Yes	53,911 (.699)	1,288	,257	,005
		No	54,791 (335)			
	STAI-*Trait*	Yes	52,311 (.740)	1,041	,309	,004
		No	53,148 (.354)			

Note: DQ=Dream Questionnaire; Par. Eta²= Partial Eta Squared

Similarly, significant differences were found between individuals with difficulty falling asleep and those without ($F_{(6.234)}$= 4.764; p<.001; p.eta2=.109) for the *nightmare* subscale of the DQ and BDI-II scores. Those with difficulty falling asleep tended to have more nightmares and higher BDI-II scores (see table 6).

Table 6. *Results of Multivariate analysis of Variance, considering the presence/absence of difficulty falling asleep as independent variable and the Dreaming Questionnaire subscales, STAY state and trait and BDI-II as dependent variables. Significant results are indicated in bold.*

			Mean (SD)	F (1.239)	p	Par. Eta²
Difficulty Falling Asleep	DQ-*recall*	Yes	12,623 (.320)	,014	,906	,000
		No	12,580 (.170)			
	DQ-*nightmare*	Yes	14,377 (.613)	7,706	,006	,031
		No	12,452 (.325)			
	DQ-*meaning*	Yes	11,075 (.373)	1,805	,180	,007
		No	11,644 (.198)			

		Mean (SD)	F (1.239)	p	Par. Eta²
BDI-II	Yes	36,038 (1.068)	18,735	,000	,073
	No	30,803 (.567)			
STAI-*State*	Yes	54,094 (.645)	,874	,351	,004
	No	54,777 (.342)			
STAI-*Trait*	Yes	52,415 (682)	,917	,339	,004
	No	53,154 (.362)			

Note: DQ=Dream Questionnaire; Par. Eta²= Partial Eta Squared

Finally, significant differences emerge between those who wake up frequently during the night and those who don't (F(6.234)= 6.597; p<.001; p.eta2=.145). Significant differences emerge between those who wake up frequently during the night for the *nightmare* subscale of the DQ for *trait* anxiety and for the BDI-II score. From the observation of the estimated averages, it emerges that those who have difficulty falling asleep tend to have more nightmares and to have higher *trait* anxiety and BDI-II scores (see table 7).

Table 7. Results of Multivariate analysis of Variance, considering the presence/absence of frequently wake up during night as independent variable and the Dreaming Questionnaire subscales, STAY state and trait and BDI-II as dependent variables. Significant results are indicated in bold.

			Mean (SD)	F (1.239)	p	Par. Eta²
Wake Up During Night	DQ-*recall*	Yes	12,583 (.274)	,001	,980	,000
		No	12,592 (.179)			
	DQ-*nightmare*	Yes	14,306 (.522)	10,686	,001	,043
		No	12,266 (.342)			
	DQ-*meaning*	Yes	11,167 (.320)	1,720	,191	,007
		No	11,669 (.209)			
	BDI-II	Yes	35,167 (.919)	17,433	,000	,068
		No	30,586 (.600)			
	STAI-*State*	Yes	54,708 (.554)	,031	,860	,000
		No	54,592 (.362)			
	STAI-*Trait*	Yes	53,917 (.582)	3,605	,059	,015
		No	52,598 (.380)			

Note: DQ=Dream Questionnaire; Par. Eta²= Partial Eta Squared

4. Discussion

The findings of the present study suggest that the presence of nightmares is associated with higher levels of depressive distress and increased intensity of both state and trait anxiety. Nightmares appear to be a plausible symptom of discomfort, sadness, apprehension, and fear, reflecting in nocturnal mental contents the main concerns of participants during wakefulness. These results are coherent with those reported in current research where dreams are often considered as a reflection of our mental and emotional states, with several studies demonstrating a significant relationship between dream content and waking concerns [18-21]. Present results are also in line with those reporting that individuals often experiencing nightmares are more likely to exhibit symptoms of depression [26, 28, 30, 31] and anxiety [15, 25, 27, 29, 39].

Although there were no significant gender differences in depression and anxiety scores, females reported consistently higher levels of dream recall and nightmare frequency and placed greater emphasis on the significance of their dreams as a tool for interpreting reality, as compared to male participants. These findings are consistent with previous research that has documented differences in dream frequency, content, and emotional tone between men and women, with women displaying a greater interest in their own dreams [40- 43].

Additionally, the results indicate that depression is more severe in individuals experiencing recent stress, insomnia, having difficulty falling asleep and frequent awakenings during the night. Even stable anxious traits of an individual appear to be more intense and contribute to frequent awakenings during the night. As reported in current literature, depression and anxiety alter sleep habits and rhythms and seem to be associated with significant sleep disturbances [44, 45]. Specifically, individuals with depression and anxiety experience difficulty falling asleep, frequent awakenings during the night, and early morning awakenings [44]. Additionally, anxiety can lead to excessive worry and arousal, which can further exacerbate sleep disturbances [45].

From present data, the frequency of nightmares is also linked to recent stress, insomnia, difficulty falling asleep, and frequent awakenings during the night. Interestingly, the memory of dreams is also related to the level of stress experienced by individuals, with those experiencing recent stress tending to recall their dreams more often. This is a truly interesting finding, suggesting that the state of overexcitement and alertness induced by stress enhances the ability to remember dreams as if they had the capacity to regulate excitement or as if dreaming activity had the function of helping the organism to cope with threats. While some studies report that individuals affected by anxious disorders show a significative reduction of dreams and speed of recall [46, 47], present results are in line with existing studies suggesting that dreaming may serve an important function in regulating emotions and coping with stress [4, 14, 15, 17]. Present data are also consistent with the results of a

study by De Gennaro and colleagues [46], who report that stress can increase the likelihood of dream recall and the vividness of dreams. The authors suggest that this may be due to the way in which stress affects the brain's arousal system, specifically by increasing activity in the amygdala and other limbic structures. These findings lend support to the idea that dreaming may serve a regulatory function in relation to emotional arousal [46].

Finally, several limitations need to be mentioned. In the present study, we observed particularly high scores on depression and anxiety scales compared to normative scores [38, 47]. A plausible reason for these findings may be because of the data collected immediately after the period characterized by the COVID-19 pandemic. The COVID-19 pandemic has had a profound impact on individuals' mental health worldwide. Recent studies have shown a significant increase in symptoms of anxiety and depression during the post-pandemic period [48, 49]. This is not surprising given the unprecedented challenges posed by the pandemic, such as social isolation, financial stress, and fear of illness. Upcoming studies should aim to utilize more representative sample, including different psychiatric populations, and individuals with various sleep disorders, to further explore these associations. However, the relation confirmed in the present study, among nightmares, depression, anxiety, and sleep disorders has clear clinical significance and highlights the importance of addressing these issues in the treatment of mental health disorders for developing effective interventions and treatments for individuals who experience distressful nightmares.

Research has shown that, for instance, nightmares can contribute to the development and maintenance of PTSD symptoms [15, 50], by reinforcing negative beliefs about oneself and the world, and by triggering re-experiencing of traumatic events [51]. Effective treatment of distressful nightmares is crucial for improving the quality of life of individuals with PTSD and reducing the impact of trauma-related symptoms, with Cognitive Behavioral Therapy for Insomnia (CBT-I) being a promising treatment approach [52], focusing on changing maladaptive sleep-related behaviors and thoughts that contribute to insomnia and nightmares.

5. Conclusion

Overall, the present findings suggest that having nightmares is closely linked to an individual's general state of apprehension and depressive suffering. According to current literature, sleep disorders are also linked to distressful nightmares, with insomnia and other sleep disturbances often contributing to the occurrence and frequency of nightmares.

In summary, while additional research is necessary to comprehensively elucidate the mechanisms of dreaming and its relevance to human experience, the examination of dreams represents a captivating field of inquiry that has significant implications for comprehending cognitive processes, fostering creativity, detecting mental health disorders, and identifying treatment opportunities.

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