



Original Article

Epidemiology of disturbing dreams in a diverse US sample

Courtney B. Worley^{a,*}, Courtney J. Bolstad^b, Michael R. Nadorff^{b,c}^a Alabama Research Institute on Aging, The University of Alabama, USA^b Department of Psychology, Mississippi State University, USA^c Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine, USA

ARTICLE INFO

Article history:

Received 20 February 2021

Accepted 19 April 2021

Available online 29 April 2021

Keywords:

Dreams

Disturbing dreams

Nightmares

Diverse sample

Epidemiology

ABSTRACT

Study objectives: Disturbing dreams are a common complaint among trauma survivors, but little epidemiological research exists to document the frequency in the general population. In addition, information about their occurrence in diverse adults is lacking.

Methods: Using the Collaborative Psychiatric Epidemiology Surveys we had the unique opportunity to examine disturbing dreams in a diverse sample of adults in the US. Disturbing dreams were measured in three different variables including trauma dreams, dreams of the worst event, and dreams of separation. A fourth variable was created to assess for any disturbing dream reported across the three categories.

Results: Disturbing dream prevalence varied in the overall sample ($N = 20,013$) based on the assessment question. Dreams of trauma was 2.01% in the overall sample, dreams of the worst event was 7.21% and dreams of separation was 1.73%. Prevalence rates of all dream variables varied by racial and ethnic group membership, gender, and age. Odds ratios were also calculated for the three variables of interest by racial and ethnic group with significant differences emerging. Women had significantly higher rates of disturbing dreams in all variables assessed ($p < 0.01$). Older adults reported significantly lower rates of disturbing dreams compared to younger and middle-aged adults ($p < 0.001$).

Conclusions: This study establishes prevalence rates for disturbing dreams in a diverse sample of US adults. Understanding the prevalence can aid in reducing barriers to care for evidence-based treatments currently underutilized.

Published by Elsevier B.V.

1. Introduction

1.1. Defining nightmares and disturbing dreams

Nightmares are vivid, disturbing dreams which cause the dreamer to have feelings of dysphoria to the point of a startled awakening [1,2]. Upon awakening, nightmares are well-remembered, and the dreamer is promptly alert and oriented [1]. Nightmares are common among the general population but infrequent, however, if frequency increases nightmares may cause extreme distress or impairment to individuals and require professional treatment [2]. Estimates of clinically significant nightmare prevalence range from 4% to 10% of the population, though less is known about nightmare prevalence among different ages, genders, and racial/ethnic groups [2]. These statistics may be conservative as nightmares are often underreported to

health professionals, which may be a function of those experiencing nightmares believing either that they cannot be treated or that having nightmares is normal [3]. Further, rates of nightmares may be higher among individuals who have experienced trauma [4,5], and evidence suggests over 70% of individuals with post-traumatic stress disorder experience nightmares [2].

Although nightmares are specifically defined by diagnostic systems like DSM-5, ICD-10 and ICSD-3, unpleasant or disturbing dreams that do not meet the definition of a “nightmare” may still cause distress and other problems [6]. For individuals of diverse backgrounds, the stringent diagnostic nosology may not fully capture their experiences as previous research has found cultural differences between diagnoses in previous versions of the DSM [7,8]. Further, much of the literature on disturbing dreams and nightmares confounds the two constructs [9–11], and some studies do

* Corresponding author. The University of Alabama, Alabama Research Institute on Aging, 2808 Capital Hall, 270 Kilgore Ln, Box 870315, Tuscaloosa, AL 35487-0315, USA.
E-mail address: cbworley@crimson.ua.edu (C.B. Worley).

not define “nightmares” for participants [5,11]. Because of these reasons, the present study examines prevalence rates of disturbing dreams, rather than nightmares specifically.

1.2. Prevalence of nightmares and disturbing dreams

Estimates of the prevalence of disturbing dreams and nightmares in the general population and across various demographic groups exist, though these statistics are often based on small, homogeneous samples. These statistics become even more complex when considering the prevalence of disturbing dreams or nightmares by demographic characteristics such as gender, age, and race/ethnicity. Overall, gender and age differences in nightmare and disturbing dream prevalence rates have been more thoroughly explored in the literature than differences across racial and ethnic groups.

Rates of nightmares and disturbing dreams vary by gender. Consistently, women report more frequent nightmares than men (eg, Ref. [12], found lifetime nightmare prevalence to be 72% for women and 61% for men) [5,12–15], but this gender difference narrows with age [11]. For women exposed to potentially traumatic experiences [16] and in adolescence to young adulthood [5,17] the gender disparity is greater.

The prevalence of nightmares and disturbing dreams also varies by age. Rates of nightmares and disturbing dreams tend to be elevated in childhood and adolescence, peak in one's 20s, and decline with advancing age [15]. In a sample of United States older adolescents and young adults, 6.7% of the sample endorsed nightmares/parasomnias [18]. Further, a sample of college students found that 4.9% met diagnostic criteria for nightmare disorder [19]. College students have been found to report significantly higher frequency of nightmares (19.5%) compared to older adults (4.3%) [10]. Although empirical evidence strongly supports reductions in nightmare prevalence with advancing age, research approximating the Finnish general adult population found self-reported nightmare frequency *increased* with age [5]. Declines in rates of nightmares and disturbing dreams with age may be due to the decreased percentage of rapid eye movement (REM) sleep with age, as Floyd and colleagues found REM-sleep percentage declines slightly with age until approximately age 75 when it then slightly increases [20]. This effect is small, however, and may not fully account for the decline in nightmare and disturbing dream prevalence with age.

To our knowledge, little, if any, research has examined the prevalence of nightmares or disturbing dreams in a racially and ethnically diverse sample of individuals. Further, although differences in the prevalence of nightmares and disturbing dreams exist between genders and age groups, further research is needed in larger, more diverse samples.

1.3. Purpose

The current study aims to expand our understanding of the unique and shared experiences of diverse individuals experiencing disturbing dreams. The purpose of this paper is to explore the occurrence of disturbing dreams in a diverse sample. In addition, we explore differences in prevalence by dream content. Due to limited existing research directly comparing group differences, no a priori hypotheses were generated.

2. Methods

2.1. Participants

Participants included 20,013 non-institutionalized adults compiled from data from three national epidemiological studies

from the Collaborative Psychiatric Epidemiology Survey (CPES) [21] database: National Comorbidity Survey Replication (NCS-R), The National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). Participants identified the following racial and ethnic group affiliations: Vietnamese, Filipino, Chinese, Other Asians, Cuban, Puerto Rican, Mexican, Other Hispanics, Afro-Caribbean, African-American, and Non-Latino Whites [22].

2.2. Measures

Utilizing nationally representative epidemiological data, the variables of interest from the CPES were selected. For information about the development of the surveys, collection procedures, and questionnaire adaptation for use with racial and ethnic minority populations including translation into languages other than English, please see Pennell and colleagues' paper [23].

The sample of 20,013 participants was predominately female (57%) and married or partnered (53.7%), and the average participant age was 43 years ($SD = 16.7$). It is noted that the sample included adults aged 18–99. Further, the sample had a wide representation of races and ancestries. Specifically, approximately 40% of the sample described themselves as Non-Latinx White, and approximately 25% described themselves as African American. Various other race and ancestry groups were included. Table 1 includes demographic characteristics of the sample. In the CPES, psychiatric disorder prevalence rates were evaluated with the World Mental Health Survey Initiative Version of the World Health Organization Composite International Interview (WMH-CIDI) [24], a fully structured lay-administered diagnostic interview that generates DSM-IV diagnosis [25]. The variables of interest related to trauma related dreams were selected for additional evaluation as well as a disturbing dream variable related to experiences with separation.

2.2.1. Worst dream

Individuals who endorsed exposure to trauma were asked about disturbing dreams about their worst event by asking “*Did you ever have repeated unpleasant about (it/the event/this experience/[(WORST EVENT)])?*”

2.2.2. Trauma related dreams

For individuals who reported multiple trauma exposures, they were asked about trauma related dreams related to an event chosen at random by the interviewer. The question “*Did you ever have repeated unpleasant about (it/the event/this experience/[(RANDOM EVENT)])?*” was used to assess participants' experiencing trauma related dreams.

2.2.3. Dreams about separation

Individuals who endorsed anxiety after separation from a loved one after the age of 5 were asked about related dreams using the following question: “*Did you often have bad dreams about (PERSON/this person) being harmed or about something happening that would separate you from one another?*”

2.2.4. Any disturbing dream

In addition, we created a variable for individuals endorsing any of the three dream variables to capture the overall prevalence of reporting any disturbing dream. This included endorsement of any dream from the three categories, endorsement of two or more categories of dreams, and endorsement of all three disturbing dream variables.

Table 1
Descriptive statistics for the sample by racial and ethnic group memberships.

	Education (% >12 years)	Age M (SD)	Gender (% Women)	Marital Status (% partnered)
Non-Latinx White	57.2%	46.65 (17.73)	54.5%	59.1%
African American	39.1%	42.93 (16.28)	63.7%	35.4%
Afro-Caribbean	51.8%	40.98 (15.46)	61.5%	42.9%
Cuban	45.8%	48.87 (16.91)	52.2%	60.8%
Puerto Rican	36.9%	41.06 (15.46)	57.0%	54.7%
Mexican	29.2%	36.16 (13.93)	54.9%	66.5%
Other Hispanic	47.4%	38.77 (14.87)	58.4%	57.9%
Chinese	69.8%	41.59 (14.02)	52.7%	69.0%
Filipino	70.4%	41.90 (16.11)	53.7%	68.1%
Vietnamese	48.5%	43.05 (14.73)	53.3%	73.8%
Other Asian	82.0%	37.96 (13.55)	51.2%	67.8%
Other	33.8%	43.26 (15.98)	57.0%	54.6%
Total	50.0%	43.38 (16.72)	57.3%	53.7%

M = Mean; SD =Standard Deviation.

2.3. Data analyses

Descriptive statistics were calculated for demographic variables. Chi Squares and logistic regressions were utilized to compare rates of disturbing dreams by racial/ethnic group, gender, and age.

3. Results

Table 1 displays descriptive statistics for the sample by racial/ethnic group categories. The differences between groups are indicated by the chi-square and significance values included in the text.

Unpleasant dreams prevalence varied in the overall sample based on the assessment question. Table 2 displays the prevalence rate of all dream variables for the total sample, by racial and ethnic group membership, by gender, and by age groups.

Dreams related to the worst event occurred most frequently (6.72%), followed by other trauma dreams (1.98%) and dreams of separation (1.70%). In the total sample, 9.10% reported any type of bad dream. The majority of individuals reporting experienced one type of bad dream (7.9%), with a small percentage reporting two types of bad dream (1.15%) and only sixteen participants (0.08%) endorsing all three dream variables. Fig. 1 displays the prevalence rates of disturbing dreams of any kind across Racial and Ethnic groups and for the total sample.

Table 2
Disturbing dream proportions and percentages by demographic variables of interest.

Racial/Ethnic and Gender	Dreams of Worst Event	Dreams of Trauma	Dreams of Separation	Any Disturbing Dream
Non-Latinx White	366/7587 (4.82%)	215/7587 (2.83%)	115/7472 (1.52%)	597/7587 (7.60%)
African American	532/4746 (11.21%)	51/4746 (1.07%)	140/4746 (2.95%)	650/4746 (13.70%)
Afro-Caribbean	154/1492 (10.32%)	1/1492 (0.07%)	39/1492 (2.61%)	179/1492 (12.00%)
Cuban	38/577 (6.59%)	18/577 (3.12%)	0/577 (0%)	51/577 (8.80%)
Puerto Rican	41/495 (8.28%)	21/495 (4.24%)	0/495 (0%)	55/495 (11.10%)
Mexican	61/1442 (4.23%)	33/1442 (2.29%)	12/1442 (0.83%)	95/1442 (6.60%)
Other Hispanic	84/1106 (7.59%)	15/1106 (1.36%)	17/1106 (1.54%)	109/1106 (9.30%)
Chinese	11/600 (1.83%)	9/600 (1.50%)	0/600 (0%)	17/600 (2.80%)
Filipino	4/508 (0.79%)	5/508 (0.98%)	0/508 (0%)	9/508 (1.8%)
Vietnamese	12/520 (2.31%)	5/520 (0.96%)	0/520 (0%)	16/520 (3.1%)
Other Asian	16/656 (2.44%)	10/656 (1.52%)	7/656 (1.07%)	28/656 (4.3%)
Other	26/282 (9.22%)	13/284 (4.58%)	10/284 (3.52%)	37/284 (13.00%)
Female	976/11,463 (8.51%)	289/11,463 (2.52%)	223/11,463 (1.95%)	13,018/11,463 (11.3%)
Male	369/8550 (4.32%)	107/8550 (1.25%)	117/8550 (1.37%)	518/8550 (6.1%)
18–25	238/3118 (7.6%)	65/3118 (2.1%)	94/3118 (3.0%)	334/3118 (10.7%)
26–35	323/4306 (7.5%)	94/4306 (2.2%)	78/4306 (1.8%)	446/4306 (10.4%)
36–45	310/4500 (6.9%)	91/4500 (2.0%)	86/4500 (1.9%)	427/4500 (9.5%)
46–55	273/3466 (7.9%)	79/3466 (2.3%)	50/3466 (1.4%)	347/3466 (10.0%)
56–65	115/2171 (5.3%)	43/2171 (2.0%)	21/2171 (1.0%)	155/2171 (7.1%)
66+	86/2452 (3.5%)	24/2452 (1.0%)	11/2452 (0.4%)	11/2452 (4.5%)
Total	1345/20,011 (6.72%)	396/20,013 (1.98%)	340/20,013 (1.70%)	1819/20,013 (9.10%)

3.1. Dreams of worst event

The prevalence of unpleasant dreams based on a positive response to dreams the worst event (trauma) was 6.72% (n = 1345) as shown in Fig. 2. Prevalence rates for the dreams of worst event were highest in African Americans (12.62%, n = 532) and more than double that of Non-Latinx Whites (5.07%, n = 366). Filipino individuals had the lowest reported rates in the sample (0.79%, n = 5). Table 3 shows the comparisons of odds ratios across the different ethnic groups for worst event dreams. African Americans and Afro-Caribbean individuals were significantly more likely than Non-Latinx Whites to endorse dreams of the worst event.

3.2. Dreams of trauma

The prevalence of unpleasant dreams based on a positive response to dreams of a random traumatic event was 1.98% in the overall sample (n = 396) as shown in Fig. 3. Dreams of trauma were most frequently endorsed by individuals in the Other category (4.58%, n = 13) followed by Puerto Ricans (4.24%, n = 21). Notably, Afro-Caribbean individuals had the lowest rates (0.07%, n = 1). Table 4 shows the comparison of odds ratios across the groups for trauma dreams. Individuals of African descent, other Hispanic, Filipino, and Vietnamese individuals endorsed significantly lower

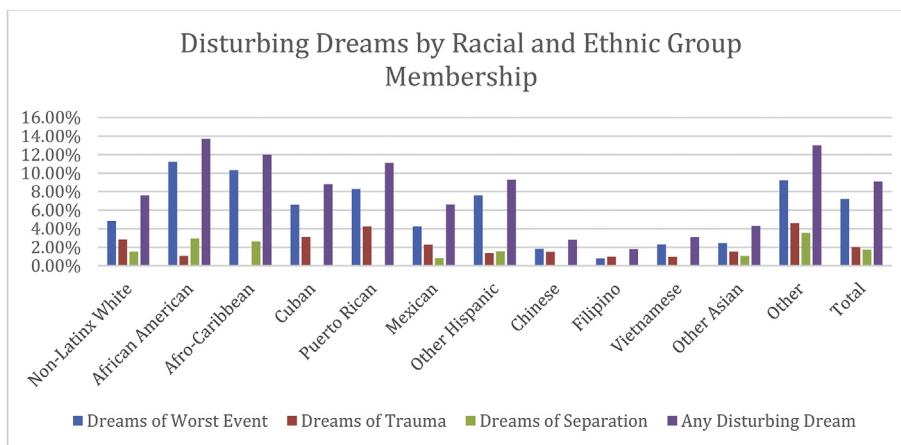


Fig. 1. Prevalence rates of disturbing dreams by racial and ethnic group membership.

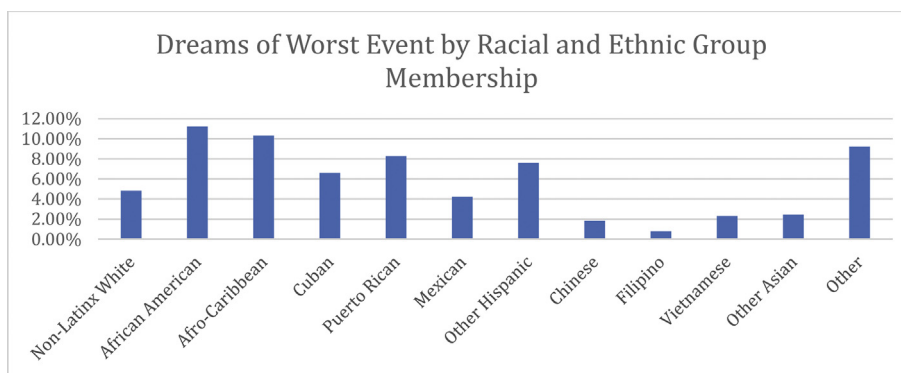


Fig. 2. Dreams of worst event by racial and ethnic group membership.

Table 3
Logistic regression results of worst event dreams by race/ethnicity.

Racial/Ethnic and Gender Background	OR	OR 95th percentile CI	p-value
Non-Latinx White	1.0	Reference	Reference
African American	2.49	2.17–2.86	<0.01
Afro-Caribbean	2.27	1.87–2.77	<0.01
Cuban	1.39	0.99–1.97	0.06
Puerto Rican	1.78	1.27–2.49	<0.01
Mexican	0.87	0.66–1.15	0.33
Other Hispanic	1.62	1.27–2.07	<0.01
Chinese	0.37	0.20–0.68	<0.01
Filipino	0.16	0.06–0.42	<0.01
Vietnamese	0.47	0.26–0.83	0.01
Other Asian	0.49	0.30–0.82	0.01
Other	1.98	1.31–3.02	<0.01

OR= Odd Ratio; CI= Confidence Interval.

rates of dreams of a random traumatic event than Non-Latinx Whites.

3.3. Dreams of separation

The prevalence rate for dreams of separation was 1.73% as shown in Fig. 4. These dreams were present in Non-Latinx Whites, African Americans, Afro-Caribbean, those identifying as other Asian and Other. Individuals from multiple groups (ie, Vietnamese, Filipino, Chinese, Cuban, Puerto Rican) did not endorse dreams of separation. Table 5 shows the comparisons of odds ratios for dreams of separation. Again, individuals of African Descent were

significantly more likely than Non-Latinx Whites to endorse dreams of separation. Those who identified as “Other” were also significantly more likely to endorse dreams of separation compared to the reference group.

3.4. Differences in rates of disturbing dreams by gender

Consistent with previous research, this diverse group of women had significantly higher rates of nightmares in all variables assessed compared to men ($p < 0.01$). Fig. 5 displays the rates by gender for all dream variables. When examining the dreams of the worst event, women reported nightmares at twice the rate of men (8.51%

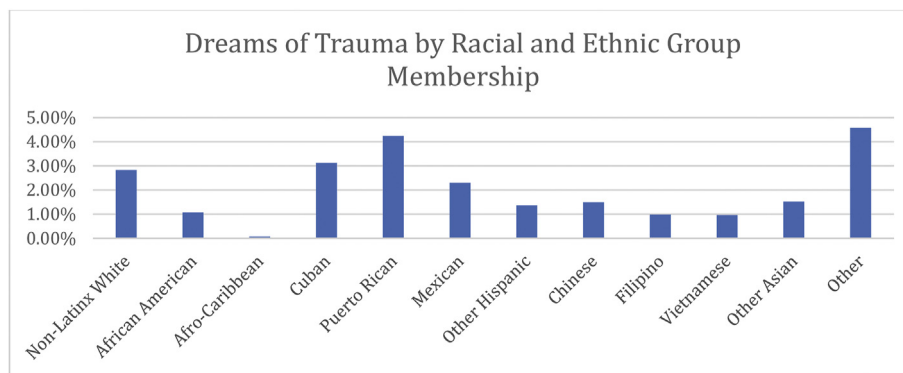


Fig. 3. Dreams of trauma by racial and ethnic group membership.

Table 4
Logistic regression results of trauma dreams by race/ethnicity.

Racial/Ethnic and Gender Background	OR	OR 95th percentile CI	p-value
Non-Latinx White	1	Reference	Reference
African American	0.37	0.27–0.51	<0.001
Afro- Caribbean	0.02	0.00–0.16	<0.001
Cuban	1.10	0.68–1.8	0.691
Puerto Rican	1.52	0.96–2.40	0.073
Mexican	0.80	0.55–1.16	0.246
Other Hispanic	0.47	0.28–0.80	0.005
Chinese	0.52	0.27–1.02	0.058
Filipino	0.34	0.14–0.83	0.018
Vietnamese	0.33	0.14–0.81	0.016
Other Asian	0.53	0.28–1.01	0.052
Other	1.65	0.93–2.92	0.09

OR= Odd Ratio; CI= Confidence Interval.

vs 4.32%), and this difference was statistically significant ($X^2(1, 20,013) = 137.71, p < 0.001$). In the other variables examined, women continued to report higher rates of dreams of trauma (2.52% vs 1.53%) and dreams of separation (1.95% vs 1.37%) than men. Both the dreams of trauma gender difference ($X^2(1, 20,013) = 40.71, p < 0.001$) and the dreams of separation gender difference ($X^2(1, 20,013) = 9.76, p = 0.002$) were statistically significant. Finally, for any disturbing dream, woman again exceeded men with nearly twice the rate (11.34% vs 6.06%), and this difference was statistically significant ($X^2(1, 20,013) = 165.92, p < .001$).

3.5. Differences in rates of disturbing dreams by age

Dreams were more frequently endorsed by younger and middle-aged adults compared to older adults (65+). Fig. 6 displays the rates across all dream variables for these groups. Dreams of the worse event and trauma dreams occurred across age groups while dreams of separation decreased sharply in older adults and were absent in the oldest old (86+).

There was a statistically significant difference between age groups for dreams of the worst event, ($X^2(5, 20,013) = 63.32, p < 0.01$). Standard residuals showed that worst event dreams were significantly more common in ages 18–25 ($z = 2.2, p = 0.03$), 26–35 ($z = 2.3, p = 0.02$), and 46–55 ($z = 3.0, p < 0.01$). Ages 36–45 did not significantly differ ($z = 0.5, p = 0.62$), and those aged 56–65 ($z = -2.8, p < 0.01$), and 66+ ($z = -6.8, p < 0.01$), reported significantly fewer dreams of their worst event.

There was a statistically significant difference between age groups for trauma dreams ($X^2(5, 20,013) = 15.41, p < 0.01$). Looking at the standard residuals, the only significant difference was that

individuals age 66+ significantly differed from the other groups, reporting significantly fewer trauma dreams ($z = -3.8, p < 0.01$).

There was a statistically significant difference between age groups for dreams of separation ($X^2(5, 20,013) = 65.14, p < 0.01$). Standard residuals showed that dreams of separation were significantly more common in ages 18–25 ($z = 6.2, p < 0.01$). There were no differences for ages 26–35 ($z = 0.6, p = 0.55$), 36–45 ($z = 1.3, p = 0.19$), and 46–55 ($z = -1.3, p = 0.19$). Those aged 56–65 ($z = -2.8, p < 0.01$), and 66+ ($z = -5.1, p < 0.01$), reported significantly fewer dreams of separation.

Lastly, we examined differences between age groups for those reporting any bad dream. Similar to the other analyses, there was a significant difference between groups, ($X^2(5, 20,013) = 95.62, p < 0.01$). Standard residuals showed that overall bad dreams were significantly more common in ages 18–25 ($z = 3.4, p < 0.01$), 26–35 ($z = 3.3, p < 0.01$), and 46–55 ($z = 2.1, p = 0.04$). Those in aged 36–45 ($z = 1.1, p = 0.27$) did not show a significant difference. Those aged 56–65 ($z = -3.3, p < 0.01$), and 66+ ($z = -8.5, p < 0.01$), reported significantly fewer bad dreams.

4. Discussion

This study is the first to report the prevalence of disturbing dreams in a nationally representative diverse sample of adults. Disturbing dreams were prevalent as reported by 9.1% of the total sample with a range of 1.80%–13.70% in racial and ethnic groups. Findings by gender and age were largely consistent with previous research highlighting greater prevalence in women (compared to men) and younger and middle-aged adults (compared to older adults). Notably, middle-aged adults demonstrated a greater prevalence of disturbing dreams compared to older adults. Our

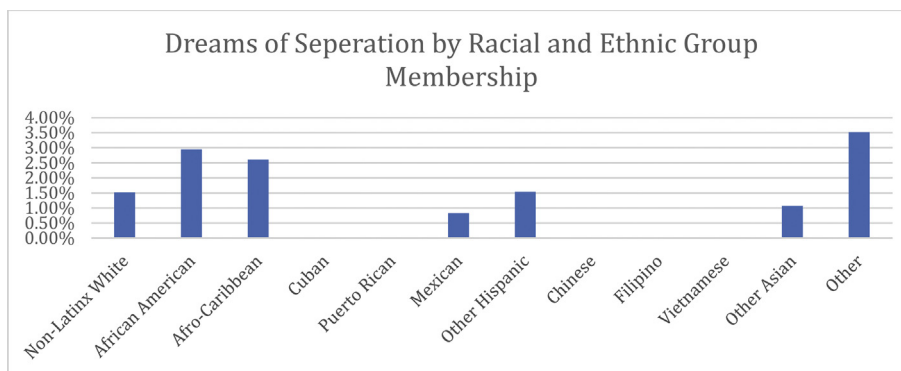


Fig. 4. Dreams of separation by racial and ethnic group membership.

Table 5

Logistic regression results of separation dreams by race/ethnicity.

Racial/Ethnic and Gender Background	OR	OR 95th percentile CI	p-value
Non-Latinx White	1.0	Reference	Reference
African American	1.98	1.54–2.53	<0.001
Afro-Caribbean	1.74	1.21–2.52	0.003
Cuban	0.00	–	0.992
Puerto Rican	0.00	–	0.992
Mexican	0.55	0.30–0.99	0.047
Other Hispanic	1.01	0.60–1.70	0.957
Chinese	0.00	–	0.992
Filipino	0.00	–	0.992
Vietnamese	0.00	–	0.992
Other Asian	0.70	0.33–1.51	0.364
Other	2.37	1.23–4.58	0.010

OR= Odd Ratio; CI= Confidence Interval.

findings replicate the existing literature by examining disturbing dream prevalence rates between genders and ages in a diverse sample. The has implications for assessment, diagnosis, and treatment in individuals from diverse backgrounds who have experienced trauma or separation that result in distressing dreams.

Disturbing dreams after trauma exposure were most commonly reported as related to the worst event, followed by other trauma dreams. Notably, this trauma exposed sample endorsed worst event dreams (6.72%) at rates exceeding established prevalence rates for PTSD in this sample [26]. For the overall sample, lifetime PTSD diagnosis rates were 5.5% and 12-month prevalence rates were 2.7%. In addition, the between group differences highlight varied prevalence rates for worst event dreams (0.79–11.21%). For example, individuals of African descent were significantly more likely to endorse all types of unpleasant dreams. Worst event

dreams for African American adults (11.2%) and Afro-Caribbean adults (10.32%) were higher than any other groups. This is consistent with higher diagnostic rates of PTSD in individuals of African descent (8.6%) [27] in this data. This pattern was also observed in individuals identifying as Other Hispanic (7.59%), Puerto Rican (8.28%), and Other (9.22%) with worst event dreams exceeding PTSD diagnostic rates. These group had higher trauma dream rates compared to other groups. Due to the small number of respondents, limited existing data, and potentially diverse composition (eg, Other groups designations), no specific comparisons or interpretations of this finding are made. Rather the authors draw attention to the differences that may exist between groups and perhaps within groups. The findings highlight the need for attention to differences in assessment, diagnosis, and treatment of disturbing dreams, consistent with cultural humility in assessment.

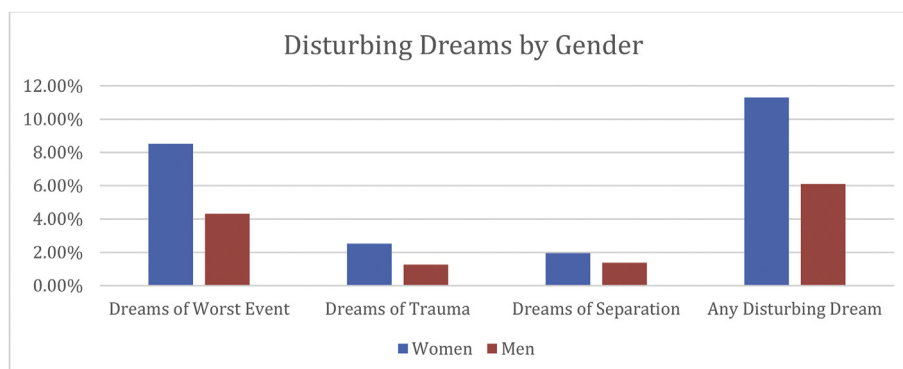


Fig. 5. Disturbing dreams by gender.

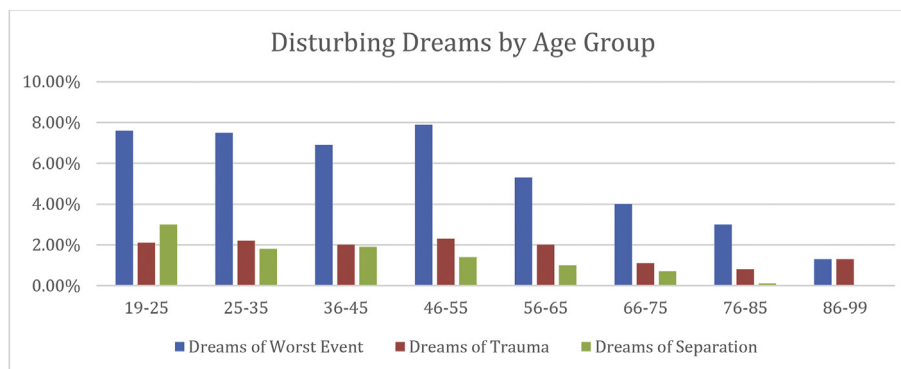


Fig. 6. Disturbing dreams by age group.

Groups also varied widely in their report of dreams about trauma. Prevalence rates of dreams of trauma were from one-tenth to half the rates of worst event dreams. However, examining between group differences indicated that inquiring about dreams more broadly and not just those about the “worst event” is an important piece of a culturally competent assessment. The entire sample reported these trauma dreams at less than 2%, but these dreams were more frequently reported by those in the Other (4.58%), Puerto Rican (4.24%), and Cuban (3.12%) groups. We are unaware of this finding existing previously, and additional research is needed to understand why dreams of trauma were reportedly more frequently in these groups. Interestingly individuals of African descent reported lower rates of these dreams comparatively with African American adults reporting a 1.07% prevalence and Afro-Caribbean adults at only 0.07% prevalence in contrast to their high rates of worst event dreams. Future studies may aid in clarifying these differences. However, this has implications for endorsements of symptoms when using standardized assessment language that may not reflect how individuals from diverse backgrounds conceptualize and report their symptoms.

Dreams of separation were less common across the sample, but again individuals of African descent had higher prevalence rates, as did the Other group. A number of groups did not endorse dreams of separation which may indicate an absence of this type of disturbing dream or other factors may have prevented endorsement in the affirmative. Again, there may be cultural differences, linguistic barriers, or factors such as reason for immigration or experiences with discrimination that impact this variability.

These findings replicate and extend previous research for gender differences in unpleasant dreams by including women from diverse racial and ethnic backgrounds. Unpleasant dreams following trauma exposure are more prevalent for women than men when considering the worst event trauma or other trauma exposure. Dreams of separation are also more frequently endorsed by women.

Diverse younger and middle-aged adults (<65) more frequently endorsed unpleasant dreams related to trauma exposure and separation. This result replicates and extends previous findings of differences between younger and older adults, considering these patterns in a diverse sample. Additionally, middle-aged adults demonstrated prevalence rates that were also significantly different than older adults. Disturbing dream prevalence in middle-aged adults is a unique finding as the literature primarily identifies the higher rates in younger adults. Although trauma exposed older adults reported unpleasant dreams less frequently, the endorsement still indicates a potential area of intervention and potential burden. The inclusion of a nationally representative diverse sample adds to our understanding of diverse older adults, but additional

research into older adults specifically is encouraged. Previous research with the CPES dataset highlights that a representative sample is not available for all groups in all age ranges [28].

Using the CPES dataset afforded great advantages in allowing for the examination of nationally representative data to examine differences in distressing dream prevalence. However, with secondary data analyses there are ingrained limitations that should be acknowledged. First, this historical data is based on DSM-IV and not the current version (ie, DSM-5). The use of queries related to distressing dreams, rather than diagnostic thresholds (eg, PTSD, Nightmare Disorder), does potentially alleviate this concern, however. Due to a limited existing literature on this topic, we did not expect to examine nightmare disorders specifically and did not attempt to control for other sleep disorders in favor of obtaining information about dreams in a nationally representative sample. The lack of existing research examining disturbing dreams in diverse, nationally representative samples and considering issues around cultural competence in assessment favored a more general approach. We did harness the unique aspects of the CPES as a secondary dataset is the use of specific measures across the datasets (eg, WHO-CIDI) that provide a large and representative national sample unavailable in prior research efforts. Also of great importance is the inclusion of individuals from a diverse, nationally representative sample and the very specific classification of individuals into their ethnic subgroups that allows for the exploration of differences at such a specific level. As highlighted before, the use of culturally competent assessment (eg, preferred language administered assessments), and oversampling of specific groups remain a strength of this dataset [22]. Future studies may wish to examine diagnostic categories more specifically or examine covariates such as acculturative stress, discrimination, and psychopathology found to be important in culturally diverse groups experiencing mental health concerns [29].

The current study adds to our understanding of disturbing dream prevalence in racial and ethnic minority samples that have experienced trauma or separation. However, the results suggest additional work is needed to understand differences in dreams and the between group differences that emerged. The within group differences also highlight that crafting research and assessment questions carefully is important to capture different types of dreams with different groups.

Research data for this article

Public-use data files are available through the Inter-university Consortium for Political and Social Research (ICPSR). This article used both public use data files and restricted use data files available only to member institutions.

Data available

The data that has been used is confidential.

Conflict of interest

None declared.

The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest associated with this article can be viewed by clicking on the following link: <https://doi.org/10.1016/j.sleep.2021.04.026>.

References

- [1] Diagnostic and statistical manual of mental disorders. 5th ed. American Psychiatric Association; 2013. <https://doi.org/10.1176/appi.books.9780890425596>.
- [2] Levin R, Nielsen TA. Disturbed dreaming, Posttraumatic Stress Disorder, and affect distress: a review and neurocognitive model. *Psychol Bull* 2007;133(3): 482–528. <https://doi.org/10.1037/0033-2909.133.3.482>.
- [3] Nadorff MR, Nadorff DK, Germain A. Nightmares: under-reported, undetected, and therefore untreated. *J Clin Sleep Med* 2015;11(7):747–50. <https://doi.org/10.5664/jcsm.4850>.
- [4] Baird T, Theal R, Gleeson S, et al. Detailed polysomnography in Australian Vietnam veterans with and without posttraumatic stress disorder. *J Clin Sleep Med* 2018;14(9):1577–86. <https://doi.org/10.5664/jcsm.7340>.
- [5] Sandman N, Valli K, Kronholm E, et al. Nightmares: prevalence among the Finnish general adult population and war veterans during 1972–2007. *Sleep* 2013;36(7):1041–50. <https://doi.org/10.5665/sleep.2806>.
- [6] Nielsen TA, Laberge L, Paquet J, et al. Development of disturbing dreams during adolescence and their relation to anxiety symptoms. *Sleep* 2000;23(6): 727–36. <https://doi.org/10.1093/sleep/23.6.1>.
- [7] Lewis-Fernández R, Hinton DE, Laria AJ, et al. Culture and the anxiety disorders: recommendations for DSM-V. *Depress Anxiety* 2010;27(2):212–29. <https://doi.org/10.1002/da.20647>.
- [8] Zhang AY, Snowden LR. Ethnic characteristics of mental disorders in five U.S. communities. *Cult Divers Ethnic Minor Psychol* 1999;5(2):134–46. <https://doi.org/10.1037/1099-9809.5.2.134>.
- [9] Agargun MY, Kara H, Özer ÖA, et al. Nightmares and dissociative experiences: the key role of childhood traumatic events. *Psychiatr Clin Neurosci* 2003;57(2):139–45. <https://doi.org/10.1046/j.1440-1819.2003.01093.x>.
- [10] Salvio MA, Wood JM, Schwartz J, et al. Nightmare prevalence in the healthy elderly. *Psychol Aging* 1992;7(2):324–5. <https://doi.org/10.1037/0882-7974.7.2.324>.
- [11] Schredl M, Reinhard I. Gender differences in nightmare frequency: a meta-analysis. *Sleep Med Rev* 2011;15(2):115–21. <https://doi.org/10.1016/j.smrv.2010.06.002>.
- [12] Bjorvatn B, Grønli J, Pallesen S. Prevalence of different parasomnias in the general population. *Sleep Med* 2010;11(10):1031–4. <https://doi.org/10.1016/j.sleep.2010.07.011>.
- [13] Li SX, Zhang B, Li AM, et al. Prevalence and correlates of frequent nightmares: a community-based 2-phase study. *Sleep* 2010;33(6):774–80. <https://doi.org/10.1093/sleep/33.6.774>.
- [14] Munezawa T, Kaneita Y, Yokoyama E, et al. Epidemiological study of nightmare and sleep paralysis among Japanese adolescents. *Sleep Biol Rhythm* 2009;7(3):201–10. <https://doi.org/10.1111/j.1479-8425.2009.00404.x>.
- [15] Nielsen TA, Stenstrom P, Levin R. Nightmare frequency as a function of age, gender, and September 11, 2001: findings from an internet questionnaire. *Dreaming* 2006;16(3):145–58. <https://doi.org/10.1037/1053-0797.16.3.145>.
- [16] Milanak ME, Zuromski KL, Cero I, et al. Traumatic event exposure, post-traumatic stress disorder, and sleep disturbances in a national sample of U.S. adults. *J Trauma Stress* 2019;32:14–22. <https://doi.org/10.1002/jts>.
- [17] Abdel-Khalek AM. Prevalence rates of reported nightmares in a cross-sectional sample of Kuwaiti children, adolescents, undergraduates, and employees. *Sleep Hypn* 2010;12(1–2):13–22.
- [18] Petrov ME, Lichstein KL, Baldwin CM. Prevalence of sleep disorders by sex and ethnicity among older adolescents and emerging adults: relations to daytime functioning, working memory and mental health. *J Adolesc* 2014;37(5): 587–97. <https://doi.org/10.1016/j.adolescence.2014.04.007>.
- [19] Estevez R. Nightmare disorder prevalence as defined by the DSM-5 in a college sample. *Univ North Texas Libr*. Published online 2017, <https://digital.library.unt.edu/ark:/67531/metadc1011749/>.
- [20] Floyd JA, Janisse JJ, Jenuwine ES, et al. Changes in REM-sleep percentage over the adult lifespan. *Sleep* 2007;30(7):829–36. <https://doi.org/10.1093/sleep/30.7.829>.
- [21] Alegria M, Jackson JS, Kessler RC, et al. Collaborative psychiatric epidemiology surveys (CPES), 2001–2003. 2008. <https://doi.org/10.3886/JCPSR20240.v8> [United States].
- [22] Heeringa SG, Wagner J, Torres M, et al. Sample designs and sampling methods for the collaborative psychiatric epidemiology studies (CPES). *Int J Methods Psychiatr Res* 2004;13(4):221–40. <https://doi.org/10.1002/mpr.179>.
- [23] Pennell BE, Bowers A, Carr D, et al. The development and implementation of the national comorbidity survey replication, the national survey of American Life, and the national latino and asian American survey. *Int J Methods Psychiatr Res* 2004;13(4):241–69. <https://doi.org/10.1002/mpr.180>.
- [24] Kessler RC, Üstun TB. The World mental health (WMH) survey initiative version of the World health organization (WHO) composite international diagnostic interview (CIDI). *Int J Methods Psychiatr Res* 2004;13(2):93–121. [https://doi.org/10.1016/S0002-9149\(99\)80503-7](https://doi.org/10.1016/S0002-9149(99)80503-7).
- [25] Alegria M, Mulvaney-Day N, Torres M, et al. Prevalence of psychiatric disorders across Latino subgroups in the United States. *Am J Publ Health* 2007;97(1):68–75. <https://doi.org/10.2105/AJPH.2006.087205>.
- [26] Kessler RC, Berglund P, Dernier O, et al. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatr* 2005;62:593–602.
- [27] Asnaani A, Richey JA, Dimaite R, et al. A cross-ethnic comparison of lifetime prevalence rates of anxiety disorders. *J Nerv Ment Dis* 2010;198(8):551–5. <https://doi.org/10.1097/NMD.0b013e3181ea169f>.
- [28] Woodward AT. A latent class analysis of age differences in choosing service providers to treat mental and substance use disorders. *Psychiatr Serv* 2013;64(11):1087–94. <https://doi.org/10.1176/appi.ps.201200401>.
- [29] Kim G, Worley CB, Allen RS, et al. Vulnerability of older latino and asian immigrants with limited English proficiency. *J Am Geriatr Soc* 2011;59(7): 1246–52. <https://doi.org/10.1111/j.1532-5415.2011.03483.x>.