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Sleep Health among Vulnerable Population

Prevalence of sleep disturbance and its relationships with mental health and psychosocial issues in refugees and asylum seekers attending psychological services in Australia

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ABSTRACT

Background: Worldwide, 68.5 million individuals are refugees, asylum seekers, or internally displaced. Although many studies have examined mental health concerns in this population, few studies have assessed sleep or examined the relationship between sleep and mental health or psychosocial functioning.
Objectives: The objectives were to (1) examine the prevalence of sleep disturbance within refugees and asylum seekers from diverse backgrounds, (2) examine mental health and psychosocial factors associated with sleep disturbance, and (3) explore whether symptoms cluster together in unique subsets of individuals.
Methods: Clinician-administered interview data (N = 2703) were obtained from a large mental health service in greater Melbourne, Australia. Data included patient demographics, sleep disturbance, mental health (anxiety, depression, traumatic stress symptoms), and psychosocial concerns (family dysfunctions, interpersonal difficulties, social isolation).
Results: A total of 75.5% of the sample reported moderate or severe sleep disturbance. Severity of sleep disturbance was positively correlated with severity of mental health symptoms, psychosocial concerns, age, and migration status. This was true in both refugee and asylum seeker populations and in both adults and children. Cluster analyses revealed 3 subsets of individuals: those with "severe sleep and anxiety symptoms," "mild to moderate symptoms," and "mild symptoms." Using "mild symptoms" as the comparator, being a refugee and increasing age were associated with a 1.57- and 1.02-fold increase, respectively, in the likelihood of classification as "severe sleep and anxiety problems" and 1.70- and 1.02-fold increase, respectively, in the likelihood of classification as "mild to moderate symptoms."
Conclusion: These findings suggest that systematic screening of sleep disturbance among refugees and asylum seekers during health-related visits is needed.

Introduction

In recent years, millions of people globally have been forced from their homes by civil conflicts, persecution, political violence, and human rights violations. The scale of forced global displacement of people is both unprecedented and accelerating. In 2007, the United Nations High Commissioner for Refugees recorded 31.7 million people displaced globally, referred to as *persons of concern*.[1] Ten years later, the figure had risen by more than 100% to 68.5 million people.[2] According to the United Nations 1951 Convention on the status of refugees, a refugee is a person who is outside his/her country of nationality or habitual residence; has a well-founded fear of persecution because of his/her race, religion, nationality, membership in a particular social group, or political opinion; and is unable or unwilling to avail himself/herself of the protection of that country, or to return there, for fear of persecution. Of the 68.5 million persons of concern, 25.4 million refugees are recognized as meeting the definition provided by the 1951 United Nations Convention and are outside their country of nationality; 3.1 million are asylum seekers who are outside their country of nationality and have applied for international protection, whose claims of refugee status remain under review; and 40 million are internally displaced persons who essentially meet the definition of a refugee but who are still within their own country or have not crossed an internationally recognized state border.[2] More than half of the world's displaced people are less than the age of 18 years.[2]

People from refugee and asylum seeker backgrounds have often been exposed to traumatic events, such as war, torture, targeted

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persecution, imprisonment, perilous flight to resettlement country, separation from family, and loss.[3] After arrival in the resettlement country, many refugees and asylum seekers face further stressors, such as communication problems, financial austerity, limited social support, the process of acculturation, marginality, and barriers to finding employment.[4] In addition, asylum seekers face the additional burden of prolonged uncertainty about the outcome of their protection claim (in some cases involving prolonged stays in immigration detention) and the threat of being forced to return to country of origin.[5] Given the considerable exposure to premigration and postmigration stress, it is not surprising that high levels of psychological distress are frequently documented in refugee and asylum seeker populations, and these levels are significantly greater than those observed in labor migrants within the same countries.[6] A recent umbrella review showed that the main psychiatric disorders found in these populations were posttraumatic stress disorder (PTSD) (9%-36%), depression (5%-44%), and anxiety (4%-40%).[7]

Substantial research in nonrefugee general population samples has demonstrated a strong link between these psychological disorders (ie, PTSD, depression, anxiety) and sleep disturbance. For example, there is a significant association between PTSD and sleep disturbance, with estimates of up to 70% to 90% of patients with PTSD experiencing difficulty falling or staying asleep.[8,9] Indeed, insomnia/sleep disturbance is one of the most common and distressing symptoms of PTSD.[10,11] Similarly, the bidirectional relationships of both depression and anxiety with sleep difficulties are well documented in the general population.[12,13]

Despite universal acceptance that sleep disturbance is common in people who have experienced premigration trauma,[14,15] few studies have investigated prevalence of insomnia and/or sleep disturbance in persons of concern. Al-Smadi and colleagues used the Arabic translation of the Insomnia Severity Index to assess insomnia status among refugees attending a health care service and found that 52.2% of Syrian and Iraqi refugees (n = 373) residing in Jordan had moderate to severe insomnia symptoms, and the severity of insomnia was highly correlated with older age, lower education, unemployment, and lack of medication.[16] Lee and colleagues found greater levels of insomnia symptoms, based on the diagnostic criteria of the *International Classification of Diseases, 10th Revision*, in North Korean refugees residing in South Korea compared to South Korean locals (38.42% vs 8.89%), and insomnia was closely associated with depression and PTSD symptoms.[17] Basishvili and colleagues reported that 41.4% of Abkhaz internally displaced persons in Georgia (n = 87) had clear signs of insomnia based on clinical interviews conducted by physicians using *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*), criteria and the Insomnia Severity Index. Insomnia symptoms were closely related to war-related stress and depressed mood.[18] Montgomery and Foldspang conducted structured interviews with the parents of 311 recently arrived refugee children from Iraq, Iran, and Palestine living in Denmark. Approximately one third of the children were reported to have frequently disturbed sleep with nightmares, difficulty falling asleep, and problems staying asleep.[19] Finally, Mölsä et al found that sleep difficulties, depression, and psychological distress were significantly higher in Somali refugees when compared to community members of the host country, Finland.[20] In sum, these studies indicate that adult and child refugees experience significant sleep disturbances, which are associated with poorer mental health and psychosocial functioning and specific sociodemographic factors.

Despite these findings, there is a need for larger-scale studies containing both adults and children and covering a larger diversity of countries of origin. Such studies would allow a more robust examination of sleep complaints in refugees and asylum seekers and the associated psychosocial and mental health correlates. This is important because preliminary research indicates that asylum seekers' and refugees' sleep difficulties may be higher and experienced differently to those of labor migrants and community samples residing in host countries.[6,20] Furthermore, currently, there are no empirical data on sleep disturbance among refugees and asylum seekers in Australia. This is important because, every year, 13,750 refugees enter Australia.[21] Therefore, the overall aim of this study was to examine sleep disturbance in a large community sample of refugees and asylum seekers attending psychological services in Australia. Specifically, we had 3 aims: (1) to examine the prevalence of sleep disturbance symptoms within this sample; (2) to examine the relationships between sleep disturbance and mental health symptoms, psychosocial concerns, and demographic profiles; and (3) to explore whether specific subsets of individuals could be identified through clusters of symptoms. Given the well-established association between migration status and psychological symptoms and resettlement difficulty,[22] for the second and third aims, we investigated the associations separately for the refugee and asylum seeker groups. Additionally, we assessed these relationships separately for children and adults. In this study, *sleep disturbance* is defined as difficulty falling asleep or staying asleep; dissatisfaction with the quantity and quality of sleep; and the impact of sleep disturbance on day-to-day functioning. The term *mental health* was used to refer to PTSD, depression, and anxiety symptoms as defined in the *DSM-IV*. We use *psychosocial concerns* as an umbrella term to describe areas of assessment, which included family dysfunction, interpersonal difficulty, and social isolation.

Method

Participants and procedures

Data used in the current study came from an existing database obtained from a large multicenter psychological service provider for refugees and asylum seekers within the greater Melbourne region, Victoria, Australia. Data from all refugees and asylum seekers who attended the centers from October 2014 to May 2017 (N = 2703) were included in the present study. This study received ethical approval from the agency's Institutional Ethics Committee and Monash University. Almost 70% of individuals were adults (n = 1892) and 46.7% were female (n = 1261). Individuals came from 61 different countries. As presented in Table 1, the sample comprised of 58.6% refugees (n = 1585) (the majority from Iraq: 28.5%, Syria: 17.4%, and Burma/Myanmar: 11.2%) and 41.4% asylum seekers (n = 1118) (mostly from Iran: 38.1%, Sri Lanka: 13.8%, and Afghanistan: 12.3%). During the period of 2015-2016, the Australia Home Affairs recorded that the 3 predominant countries of origin for refugee groups entering Australia were Iraq (28%), Syria (27.4%), and Burma/Myanmar (12.5%),[23] and the main countries of origin for asylum seekers were Iran (30.3%), Sri Lanka (18.8%), and Afghanistan (15.4%).[24] Thus, the breakdown of the countries in the present study reflected a similar overall pattern of the countries of origin for refugee and asylum seeker arrivals in Australia during that time period.[23,24] Of the asylum seekers in the sample, 11% were currently held in highly restricted immigration detention facilities/compounds (n = 123); 61% were currently in community detention and thus were residing in temporary housing, but were still subject to curfews and other supervision and reporting arrangements (n = 682); and 28% were on a temporary visa living freely in the community (n = 313).

Data were derived from the Initial Intake Assessment where a qualified clinician (ie, a culturally-diverse psychologist or social worker who was trained in delivering culturally responsive services) conducted a semistructured clinical interview focused on the client's migration history, family background, psychosocial concerns, mental health symptoms, and any other issues. The Initial Intake Assessment was usually conducted with a qualified interpreter, sex preference

Table 1
Individuals demographics information

Demographics	Combined		Refugees		Asylum seekers	
	N	%	n	%	n	%
Age, y						
0-10	389	14.4	229	14.4	160	14.3
>10-20	523	19.3	366	23.1	157	14.0
>20-30	425	15.7	189	11.9	236	21.1
>30-40	620	22.9	270	17.0	350	31.3
>40-50	417	15.4	261	16.5	156	14.0
>50-60	229	8.5	181	11.4	48	4.3
>60-70	79	2.9	69	4.4	10	0.9
>70	21	0.8	20	1.3	1	0.1
Sex						
Female	1261	46.7%	759	47.9%	435	38.9%
Male	1442	53.3%	826	52.1%	683	61.1%
Country of origin						
Iraq	526	19.5%	451	28.5%	75	6.7%
Iran	517	19.1%	91	5.7%	426	38.1%
Afghanistan	298	11.0%	160	10.1%	138	12.3%
Syria	289	10.6%	276	17.4%	10	0.9%
Burma (Myanmar)	201	7.4%	177	11.2%	24	2.1%
Sri Lanka	156	5.8%	2	0.1%	154	13.8%
Other 55 countries	716	26.6%	428	27%	291	26.1%
Migration status						
			1585	58.6%	1118	41.4%

considered, and generally took 4-6 hours of face-to-face meetings over 2 or 3 sessions. The majority of the sample was referred by settlement services, schools, general practitioners, and immigration detention health services, and a small number of participants were self-referred. The Initial Intake Assessment was generally conducted in an individual format (unless the client him/herself requested to be accompanied by someone else). However, when an entire family was referred for assessment, a family assessment would be conducted instead of individual assessment. The Initial Intake Assessment commonly took place in the service provider's centers, but assessment could also be conducted at the participant's home or school, or inside the immigration detention facility. After completing the assessment, clinicians rated and recorded symptom severity, as required by the agency's National Minimum Data Set.

Assessment

To ensure client confidentiality, data made available for this study were deidentified. Data included demographic information (age, sex, country of origin, and migration status), sleep disturbance, mental health symptoms (PTSD, depression, and anxiety), and psychosocial concerns (family dysfunction, interpersonal difficulties, and social isolation). Based on the clinical interview, clinicians rated sleep, mental health, and psychosocial concerns on a 4-point severity scale ("absent," "mild," "moderate," or "severe"). To ensure consistency of clinician-assessed ratings, all clinicians were trained using the National Minimum Data Set Guidelines. The guidelines were developed and applied by the 8 large specialist refugee rehabilitation agencies in Australia. Cultural formulation was considered in determining the presence and severity of symptoms/issues, recognizing cultural differences in expression, experience, and coping strategies. All clinicians were extensively trained and used a standardized manual to guide their assessment. Weekly group supervisions were available to discuss complex issues pertaining to Initial Intake Assessment and treatment.

According to the guidelines, *sleep disturbance* was defined as difficulty falling asleep or staying asleep. Severity ratings depended on dissatisfaction of quantity and quality of sleep and impact on day-to-day functioning. Sleep assessment was a stand-alone item that was separate from all other mental health questions. PTSD, depression, and anxiety ratings were based on *DSM-IV* criteria, and the severity ratings were related to the number of symptoms reported, the frequency of symptoms, and the impact on daily functioning and interpersonal relationships. Anxiety symptoms were related to uncontrollable worrying, catastrophic anticipatory thinking and somatic/muscle tension and were explicitly assessed separately from PTSD symptoms of intrusive distressing recollection of traumatic events, hypervigilance/hyperarousal, and symptoms of avoidance. *Family dysfunction* was defined as problems including arguments, verbal or physical hostility, criticism and denigration, parental neglect/rejection, overrestriction, and sexual and/or physical abuse. The information collected included parent-child and sibling relationship problems (parent-child conflict causing stress to the adult, child, or family), attachment problems, parenting problems/deficiencies, and acrimonious family dynamics causing significant stress. Interpersonal difficulties consisted of aggressive and angry presentations (ie, threatening/intimidating, bullying, antisocial criminal behaviors, and explosive anger), boundary issues (ie, inappropriate personal boundaries, suspicious/cautious behaviors, and sexualized behaviors in children), and/or withdrawal (ie, school refusal and difficulty in trusting others). *Social isolation* was defined as perceived or actual social isolation resulting in 1 or more of the following: limited social support, limited participation in social activities, decreased ability to spend time with people, avoidance of social contacts, and pervasive feelings of isolation or loneliness. The severity ratings of all 3 psychosocial concerns were based on the person's level of distress experienced and the level of impairment in usual daily activities.

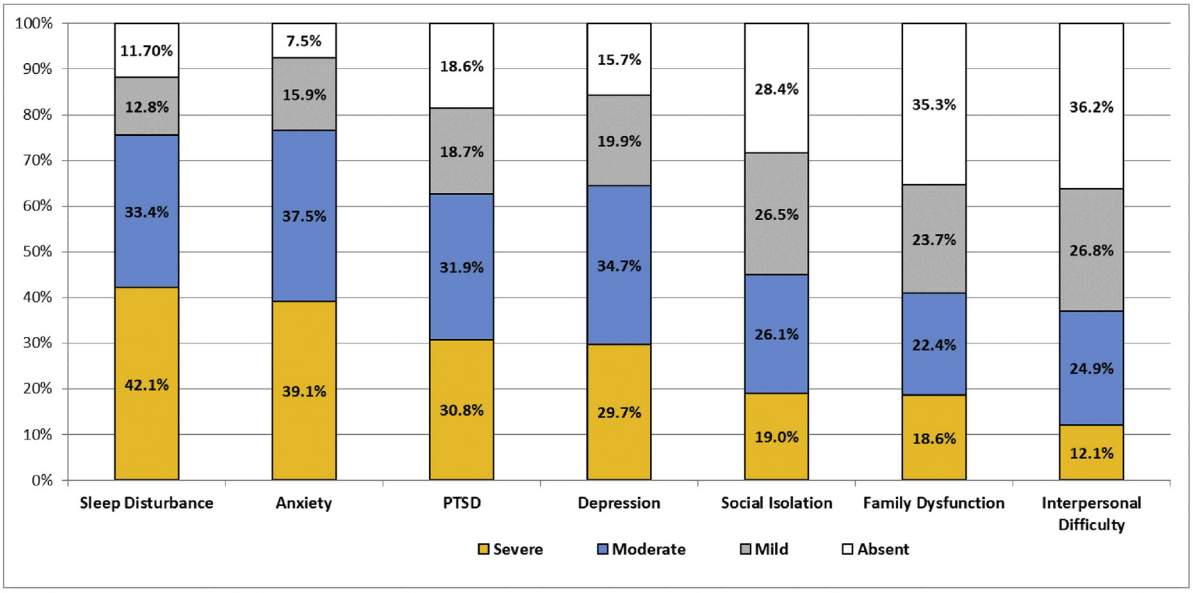
Statistical analyses

Data were screened to ensure quality and to check standard statistical assumptions. Missing data were less than 2% for all measures (disturbed sleep: 0.5%;, anxiety: 0.3%;, depression: 0.4%, PTSD: 0.8%;, family dysfunction: 1.8%;, interpersonal difficulties: 1.7%, and social isolation: 0.8%) and occurred completely at random. The missing data were excluded listwise per the recommendations of Hair et al.[25] Analyses compared individuals with missing data to individuals with complete data to formally examine possible nonresponse biases. Aim 1 is purely descriptive. For aim 2, two analyses were conducted. First, Spearman correlation and multinomial regression analyses were performed to study the relationship between mental health, psychosocial concerns, and demographic profiles with severity of sleep disturbance as the dependent variable. When interpreting mean effect sizes, Cohen guidelines were used, whereby r 0.10-0.29 = small, 0.30-0.49 = medium, and ≥0.50 = large.[26] Initially, ordinal regression analysis was chosen, but the data failed to meet the assumptions of parallel lines and goodness of fit; thus, we used multinomial regression analysis. Second, we used Spearman correlation coefficients and Fisher r-to-z transformation to investigate differences in the relationships between each mental health and psychosocial concern, and sleep disturbance for (1) asylum seekers vs refugees and (2) adults vs children. Another strategy to test whether these relationships differ between asylum seekers and refugees or between adults and children would be to include interaction terms in the multinomial regression models. However, this would require coding four interaction variables for each explanatory variable (1 for each level), making interpretation complex. Therefore, to facilitate interpretation, we chose to use Fisher r-to-z transformations to examine whether the association between sleep and variables of interest differed with migration status and/or age category.

For aim 3, we performed a multistep exploratory cluster analysis using the sleep, mental health, and psychosocial measures to define clusters. Severity ratings were treated as ordinal data. As suggested by Hair, Anderson, and Tatham, the first step involved a hierarchical

a

Percentage of all individuals in each severity rating by symptoms category.



b

Percentage of adults in each severity rating by symptoms category.

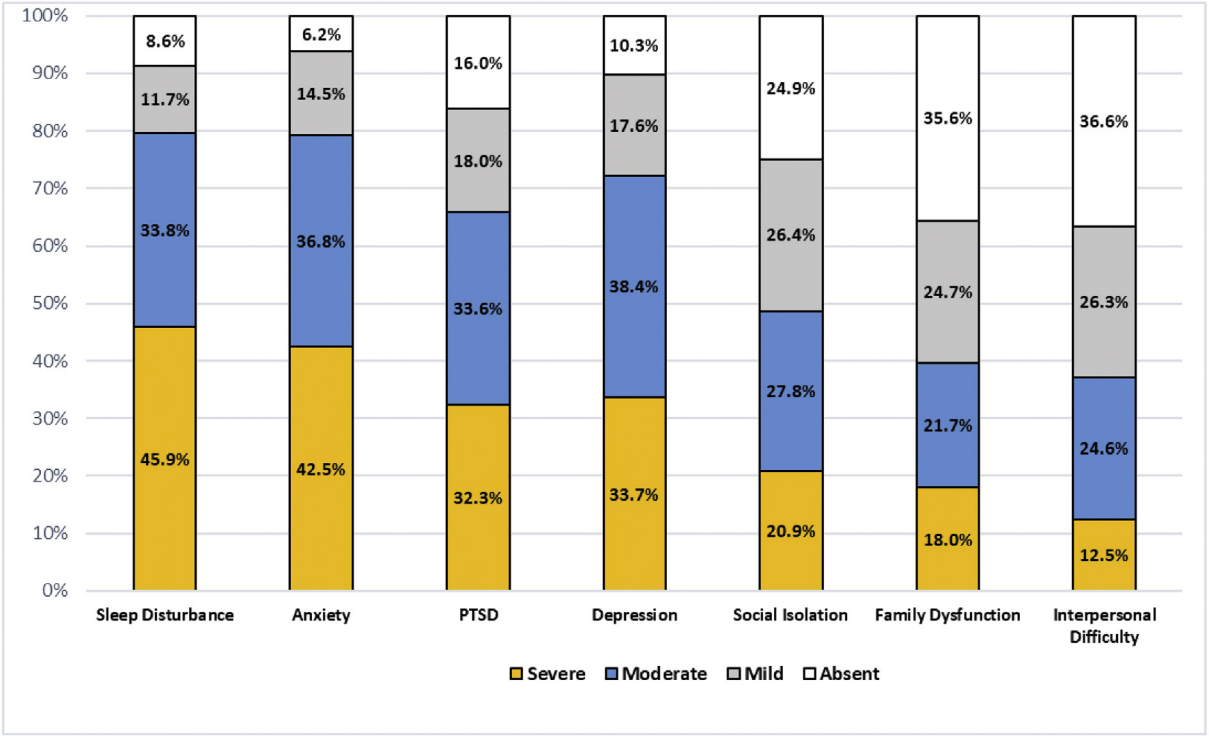


Fig. 1. Percentage of all individuals (A), adults (B), and (C) children in each severity rating by symptoms category. Bars represent the proportion of participants at each severity level within each symptom category. Symptom categories ordered according to proportion of participants showing *severe* symptoms.

cluster procedure using Ward's method of defining distance between clusters to determine the range of likely cluster size solutions.[27] Cluster membership was appraised by calculating the total sum of squared deviations from the mean of a cluster. The criterion for fusion was that it should produce the smallest possible increment in the error of the sum of squares.[27] We then conducted a nonhierarchical, *k*-means clustering procedure for each identified potential cluster size. For the second step, we split the sample in half, stratifying for

c

Percentage of children in each severity rating by symptoms category.

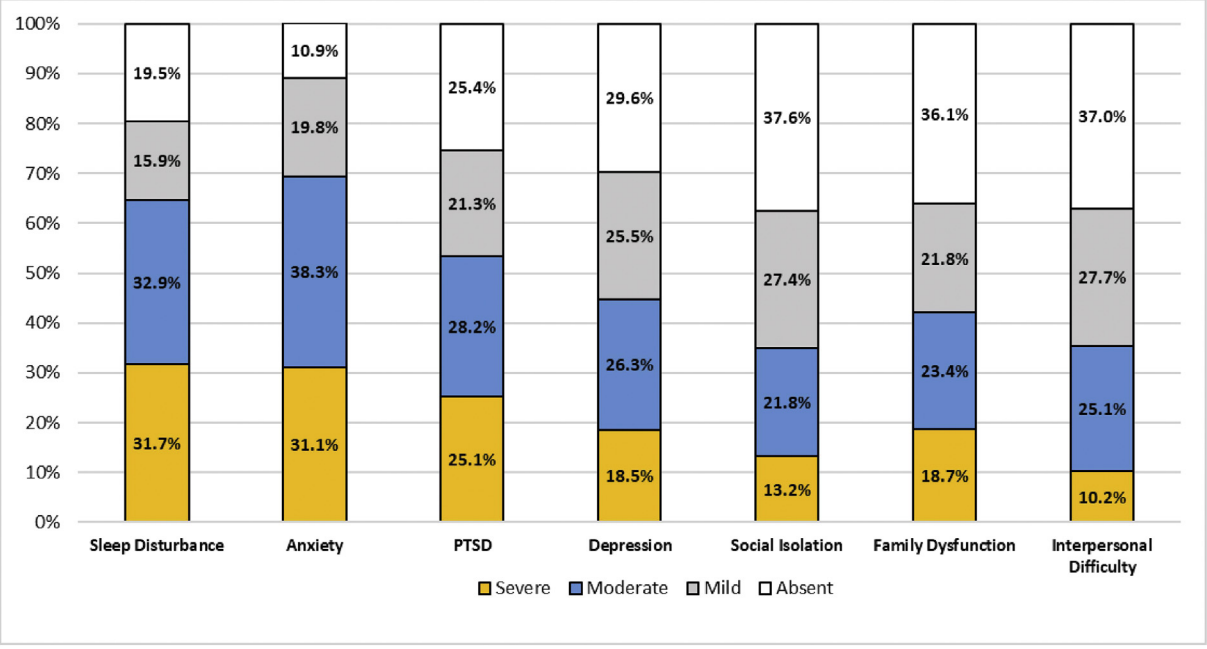


Fig. 1 (*continued*).

migration status, sex, and age. One half of the sample was used for exploratory analyses, whereas the second half was used to confirm the exploratory findings. For those cluster solutions showing consistency between each half of the sample, we evaluated the resultant clusters based on the clinical relevance (are symptom profiles of various clusters clinically useful), distinctiveness (are there clear differences among symptom profiles), and parsimony (bias toward solution with fewest useful clusters) of each cluster solution.[27] Once a final cluster solution was found, multinomial and logistic regressions examined demographic differences among the clusters.

Results

Aim 1: prevalence rates of sleep disturbance

Figure 1 shows the prevalence of severity ratings for each variable of interest. A greater number of individuals reported severe sleep disturbance (42.1%) than those who reported severe problems in any other category. Moreover, sleep disturbance was the second most prevalent problem reported among asylum seekers and refugees after anxiety. Only 11.7% of the sample reported not experiencing any sleep disturbance.

Aim 2: associations between sleep disturbance and demographic profiles, mental health, and psychosocial concerns

Severity of sleep disturbance was positively associated with all 3 mental health concerns (all large effect sizes) and all 3 psychosocial concerns (small to medium effect sizes).[26] The severity of sleep disturbance was significantly correlated with age (ie, older individuals stated greater sleep disturbance) and migration status (ie, asylum seekers reported more severe sleep disturbance) but not sex. See Table 2.

When all variables were considered together in a multinomial regression, greater severity of sleep disturbance remained significantly associated with greater severity of PTSD, depression, anxiety, family dysfunction, and interpersonal difficulties. Additionally, asylum seekers continued to show greater sleep disturbance severity ($P < .001$, omnibus model McFadden $R^2 = 0.30$). Age and social isolation were no longer significantly associated with sleep disturbance. See Table 3.

When considering associations between sleep disturbance and each mental health and psychosocial concern separately for refugees and asylum seekers, there were large effects for the relationships between sleep disturbance and each mental health concern in both refugees ($r = 0.57$-0.62) and asylum seekers ($r = 0.43$-0.51), whereas the relationship between sleep disturbance and each psychosocial concern ranged from small to medium (Table 4). Additionally, as shown in Table 4, the correlation coefficients for the relationships between sleep and all psychosocial measures differed significantly for the refugee and asylum seeker groups.

When considering these associations separately for children and adults, large effects were observed between sleep disturbance and mental health symptoms for both adults ($r = 0.57$-0.60) and children ($r = 0.56$-0.63; Table 4). For the relationships between sleep disturbance and psychosocial concerns, small effects were observed for children ($r = 0.15$-0.26), whereas small to medium effect sizes were observed for adults ($r = 0.21$-0.32). The only correlation coefficient that differs significantly between children and adults was the correlation coefficient for the relationship between sleep disturbance and interpersonal difficulties (Table 4).

Aim 3: identification of symptoms cluster and prediction of cluster membership

Initial hierarchical cluster analysis suggested potential cluster solutions of sizes 2, 3, and 4. Subsequent nonhierarchical, *k*-means, split-half randomization evaluation of each potential cluster solution size showed the 2-cluster solution to be of dubious clinical utility (ie, all high vs all low symptoms) and unstable with respect to

Table 2
Nonparametric correlations of sleep disturbance with demographics, mental health, and psychosocial concerns

	ρ	95% CI	Significance
Demographics			
Age	.18	.14-.21	<.001
Sex	.01	−.03 to .05	.60
Migration status	−.09	−.13 to −.06	<.001
Mental health			
PTSD	.62	.59-.65	<.001
Depression	.59	.56-.61	<.001
Anxiety	.57	.54-.60	<.001
Psychosocial concerns			
Family dysfunction	.22	.18-.25	<.001
Interpersonal difficulty	.22	.18-.25	<.001
Social isolation	.32	.29-.36	<.001

Note. Cohen effect size *r* (1992) 0.10 = small, 0.30 = medium, and 0.50 = large.

Table 3
Multinomial regression of sleep disturbance predicted by demographics, mental health, and psychosocial concerns

	χ^2	*df*	Sig.	Direction of effect	Effect size (Cramer *V*)
Demographics					
Age	3.93	3	.27		
Sex	.91	3	.82		
Migration status	40.00	3	<.001	Asylum seekers > refugees	.12
Mental health					
PTSD	313.32	9	<.001	↑PTSD = ↑ sleep severity	.41
Depression	244.25	9	<.001	↑Dep = ↑ sleep severity	.36
Anxiety	138.82	9	<.001	↑Anx = ↑ sleep severity	.39
Psychosocial concerns					
Family dysfunction	40.64	9	<.001	↑Fam dys = ↑ sleep severity	.14
Interpersonal difficulty	31.78	9	<.001	↑Inter diff = ↑ sleep severity	.13
Social isolation	15.78	9	.07		

Note. Cohen effect size *r* (1988)[40] *df* 3, 0.10 = small, 0.30 = medium, 0.50 = large, and 0.70 = very large. For *df* 9, 0.06 = small, 0.17 = medium, 0.29 = large, and 0.40 = very large. Outcome categories descriptors for sleep disturbance, mental health, and psychosocial concerns were absent, mild, moderate, and severe.

demographics of the clusters (ie, predictors of cluster membership were different for each half of the sample). The 4-cluster solution was unstable in cluster centers, as well as demographic correlates of the clusters, across each split half of the sample. Furthermore, the addition of the fourth cluster, relative to the 3-cluster solution, only split the middle severity cluster into 2 categories, and this was not seen as a clinically meaningful change. Finally, the 3-cluster solution provided a marginal increase in accuracy (40.6%±6.2%) compared to the baseline 1-cluster solution (35.2%), whereas the 2-cluster solution provided no marginal improvement in accuracy (34.1%). Although the 4-cluster solution showed a larger marginal improvement (49.6%), we believe the disadvantages outlined above outweigh this small advantage. Considering all factors, then, a 3-cluster solution was considered the most stable, meaningful, and parsimonious. Classification based on the 3-cluster solution revealed that subgroup 1 ("severe sleep and anxiety symptoms," 32.8% of the sample) comprised individuals who showed moderate mental health and psychosocial symptoms with severe sleep disturbance and anxiety symptoms. Subgroup 2 ("mild to moderate symptoms," 37.6%) consisted of individuals who reported moderate sleep and mental health symptoms with mild psychosocial concerns. Subgroup 3 ("mild symptoms," 29.6%) comprised individuals who indicated mild concerns on all variables. See Table 5 for cluster centers on each individual variable and Table 6 for demographics of individuals in each cluster.

Using the "mild symptoms" subgroup as the comparator, it was found that being a refugee and increasing age were associated with a 1.57- and 1.02-fold increase, respectively, in the likelihood of classification as "severe sleep and anxiety problems" (odds ratio [OR] 1.57, 95% confidence interval [CI] 1.28-1.93, $P < .0001$; OR 1.02, 95% CI 1.02-1.03, $P < .0001$) and a 1.70- and 1.02-fold increase, respectively, in the likelihood of classification as "mild to moderate symptoms" (OR 1.70, 95% CI 1.39-2.07, $P < .0001$; OR 1.02, 95% CI 1.02-1.03, $P < .0001$). Although the symptom severity was generally higher in "severe sleep and anxiety symptoms" subgroup, no significant difference in migration status, sex, or age was observed when compared to the "mild to moderate symptoms" subgroup.

Discussion

Although significant research has investigated the prevalence of mental health disorders in refugee and asylum seeker populations, there are currently limited empirical data available to determine the prevalence of sleep disturbance among these populations. This study aimed, therefore, to examine the prevalence of sleep disturbance symptoms in refugee and asylum seeker populations, as well as the association between sleep disturbance and mental health. In the current study, individuals were refugees and asylum seekers who attended psychological services in greater Melbourne, Australia. The sample came from a highly diverse set of countries of origin, which was representative of the overall pattern of countries of origin in refugees and asylum seekers who arrived in Australia during that time frame.[23,24] To our knowledge, this was the largest (N = 2703) and first study to examine the association between sleep

Table 4
Correlations of sleep disturbance with mental health and psychosocial concerns in asylum seekers vs refugees and children vs adults

	Refugees n = 1585 (58.6%)		Asylum seekers n = 1118 (41.4%)		Group comparison	Children n = 820 (30.3%)		Adults n = 1883 (69.7%)		Group comparison
	ρ	95% CI	ρ	95% CI	*z* scores	ρ	95% CI	ρ	95% CI	*z* scores
Mental health										
PTSD	.66***	.62-.69	.56***	.51-.61	4.09	.63***	.58-.67	.60***	.56-.63	1.15
Depression	.64***	.61-.67	.52***	.47-.57	4.65	.58***	.63-.63	.58***	.54-.61	0.00
Anxiety	.62***	.57-.67	.49***	.43-.54	4.83	.56***	.50-.62	.57***	.53-.61	−0.35
Psychosocial										
Family dysfunction	.27***	.22-.32	.13***	.06-.18	3.74***	.25***	.18-.31	.21***	.17-.25	1.01
Interpersonal difficulty	.24***	.19-.28	.14***	.07-.19	2.66***	.15***	.08-.21	.23***	.19-.27	−1.98*
Social isolation	.35***	.30-.39	.27***	.21-.32	2.27*	.26***	.19-.22	.32***	.28-.37	−1.56

***$P < .001$, **$P < .01$, *$P < .05$.

Table 5
Cluster centers for 3-cluster solution

	Severe sleep and anxiety symptoms n = 857 (32.8%)	Mild to moderate symptoms n = 982 (37.6%)	Mild symptoms n = 773 (29.6%)
Disturbed sleep	Severe	Moderate	Mild
PTSD	Moderate	Moderate	Mild
Depression	Moderate	Moderate	Mild
Anxiety	Severe	Moderate	Mild
Family dysfunction	Moderate	Mild	Mild
Interpersonal difficulty	Moderate	Mild	Mild
Social isolation	Moderate	Mild	Mild

disturbance and psychosocial concerns in these populations and to include both adults and children in the same study.

Overall, >75% of refugees and asylum seekers reported moderate to severe sleep disturbance, and sleep was rated in the severe category more often than any other symptom evaluated. The high rate of sleep disturbance is comparable to previous studies, albeit slightly higher than what Al-Smadi and colleagues reported in Syrian and Iraqi refugees settling in Jordan (52.2% reported moderate to severe insomnia).[16] Our numbers may be slightly higher because we assessed sleep disturbance, as opposed to insomnia, per se, and our data were based on individuals who attended a mental health service, whereas Al-Smadi recruited their participants from a general health care service. On the other hand, the number of individuals who reported *severe* sleep disturbance in our study (42.1%) is similar to the findings of Basishvili and colleagues (41.4%),[18] who also used clinician-run interviews. Overall, sleep disturbance was the second most prevalent problem reported among asylum seekers and refugees, after only anxiety.

Older individuals and asylum seekers reported more severe sleep disturbance relative to younger individuals and refugees; we found no significant correlations with sex. The association of sleep problems with age, and not sex, has been reported in 2 of the 3 prior studies on sleep in adult refugees.[16,18] A significant proportion (>70%) of our asylum seeker sample was currently in immigration detention facilities or community detention. Studies have shown that asylum seekers living in detention centers face great uncertainty because they are at risk of deportation.[5,28] Therefore, it is perhaps unsurprising that being an asylum seeker is significantly correlated with sleep disturbance.

Table 6
Demographics of the 3-cluster solution analysis

	Severe sleep and anxiety symptoms n = 857 (32.8%)	Mild to moderate symptoms n = 982 (37.6%)	Mild symptoms n = 773 (29.6%)
	n (%)	n (%)	n (%)
Migration status			
Refugee	490 (57.2%)	535 (54.5%)	510 (66.0%)
Asylum seeker	367 (42.8%)	447 (45.5%)	263 (34.0%)
Sex			
Female	429 (50.0%)	444 (45.2%)	344 (44.5%)
Male	428 (50.0%)	538 (54.8%)	429 (55.5%)
Age group			
Children	218 (25.4%)	249 (25.4%)	353 (45.7%)
Adults	639 (74.6%)	733 (74.6%)	420 (54.3%)
	***M* (SD)**	***M* (SD)**	***M* (SD)**
Age	31.4 (16.4)	30.9 (16.6)	25.2 (16.6)

Note: *M* = mean, SD = standard deviation.

The severity of sleep disturbance was significantly associated with the severity of mental health and psychosocial problems in the overall sample, as well as the subsamples of refugees, asylum seekers, adults, and children. The relationship between sleep disturbance and psychosocial concerns was especially strong in refugees relative to the other demographic groups. The positive association between severity of sleep disturbance and severity of mental health symptoms is consistent with previous studies in both adults[17] and children.[19] Some research has suggested that Western psychiatric disorders may not fully encapsulate the experiences and responses of refugees and asylum seekers.[29,30] Hence, assessing psychosocial concerns is a useful way to understand additional impacts of the refugee experience.[31] The present study assessed family dysfunction, interpersonal difficulty, and social isolation. Sleep disturbance was positively associated with all 3 psychosocial concerns. Although these data show a consistent connection, clearly, more research is needed to understand the importance of psychosocial factors in the multifactorial explanation of sleep disturbance and long-term general well-being of refugees and asylums seekers.[32] In a recent qualitative study, Valibhoy and colleagues studied young adult refugees' experiences of Australian mental health services. They found that young refugees wanted clinicians to not only focus on their mental health but also recognize their life context in terms of the impact of psychosocial and traumatic stressors, both past (eg, experiences of war and conflict) and present (eg, social exclusion, educational issues, and relationship problems).[33] This extended to sleep difficulties where the researchers found that participants provided unfavorable comments about suggested sleep-related strategies, reporting that clinicians often provided basic sleep hygiene without considering the refugee journey and experience and their ongoing impact on sleep.[33] In this study, it was surprising to find that refugees in this study showed a stronger relationship between sleep disturbance and psychosocial concerns than asylum seekers. It is important to note, though, that our data showed that refugees were more likely to report high severity across a variety of symptom domains, not just mental health. One possible explanation is that almost 60% of refugees in this sample came from Iraq or Syria. Ongoing concern about the safety of family members is reported to be a significant source of stress among Syrian refugees, and they frequently receive contradictory or misleading information, leading to frustration and stress.[34] In addition, older refugees and children may be particularly vulnerable to psychosocial concerns. For example, older Syrians often feel particularly isolated and may rarely leave their homes after resettling in a new country.[35] Similarly, it was found that young refugees from a variety of backgrounds, living in Australia, reported psychosocial stressors such as perceived discrimination, social exclusion, and bullying, which were related to lack of well-being.[36] Stress is well known to precipitate and perpetuate sleep disturbance, and these additional stressors faced by refugees may contribute to a strong relationship between sleep and psychosocial concerns.

Finally, we explored whether identifiable subsets of symptom clusters exist in this sample of refugees and asylum seekers. A 3-cluster solution emerged, consisting of subgroups showing (1) severe sleep and anxiety symptoms, (2) mild to moderate problems in all areas, and (3) mild problems in all areas. Refugees were about 60%-70% more likely to be in the more severe category, relative to the "all mild" category, and the likelihood of being in the more severe category increased by 2% with each additional year of age. The lack of significant difference in differentiating the demographic profiles between the 2 more severe subgroups suggests that there may be important variables in predicting subgroups not measured here.

The present study's findings should be interpreted in the context of some limitations. First, we did not randomly sample from all

refugees and asylum seekers in the local community. Rather, individuals in this study were attending mental health services (referred and self-referred), and thus, the findings may not be generalizable to all refugees and asylum seekers groups, as it is likely that treatment-seeking individuals may have higher rates of sleep disturbance, psychological symptoms, and psychosocial stressors than individuals not presenting to mental health services. On the other hand, we obtained data from *all* new intakes during the relevant time period, and thus, our data should be highly generalizable to treatment-seeking samples. Second, the mental health measures were symptom severity measures rather than diagnostic, and it is, therefore, difficult to directly compare these prevalence estimates to more traditional prevalence estimates. Third, all research in these populations is performed in a specific political and social context. The data included in this study reflect the specific conflicts and unsettled global situations from approximately 2014 to 2017. On the one hand, this is a strength given that most individuals here came from countries still enduring significant conflict, suggesting that our findings will generalize across multiple countries resettling these individuals and will be relevant for the foreseeable future. On the other hand, future generations of this population may face different situations. Fourth, the assessments were not structured diagnostic interviews or validated self-report questionnaires. Although the clinician-assessed severity ratings were based on standardized training, one has to be cautious when comparing the results with other studies. There is substantial evidence from studies on war refugee populations[37] as well as general populations[38] that the information individuals provide changes depending on how and when they are being asked, who they are talking to, and why they are being asked. It has been reported that participants in face-to-face interviewing may provide more positive and socially desirable responses and be less willing to disclose sensitive information than in self-report questionnaires.[39] If true, this suggests the current data may actually underestimate the scope of the problems. However, given that our data were based on standardized clinician-assessed ratings over 4-6 hours of face-to-face meetings (over 2 or 3 sessions) with a qualified interpreter, one could argue that these data may be considered more reliable compared to other large studies. Last, there could have been assessment of additional variables that may be linked to sleep disruption, such as current sleeping arrangements (private/shared room, number of people in the living compound, safety), length of displacement before arriving in Australia, and length of detention.

Future research should consider assessing sleep disturbance with multimodal methods to explore the cultural context of sleep and mental health complaints in migrants. For example, studies should include both objective (eg, actigraphy or home-based polysomnography) and subjective sleep measures (eg, sleep logs and sleep inventories). The use of qualitative methodologies would allow researchers to further examine conceptions of sleep and mental health in this particular population. Finally, Ecological Momentary Assessment can be a useful method for studying tighter temporal associations between sleep disturbances on one night and daytime outcomes the next day, as well as pathways of sleep and PTSD.

There are several important potential implications of this study. Prevalence data are vital for increasing the knowledge base of the sleep, trauma, and epidemiological and global mental health fields. Our findings highlight the extent of sleep problems in this population, and we hope that they may help inform holistic psychological assessment and future development of targeted interventions and/or incorporation of sleep into existing interventions. The present study adds to the existing, but very limited, knowledge of sleep disturbance among refugees and asylum seekers and, importantly, extends beyond major mental disorders and assesses the impact on psychosocial concerns. Results of the cluster analysis suggest that increasing age and being a refugee are significant risk factors for worse symptoms overall, especially sleep disturbance and anxiety. Clinicians should be aware of the diversity of symptom presentations in this population and screen for sleep disturbance among refugees and asylum seekers during all health-related visits.

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Competing interest statement

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