Psychometric Properties of the Chinese Version of Nightmare Distress Questionnaire in Adolescents With Psychiatric Disorders

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Nightmare Distress Questionnaire (NDQ) is commonly used to assess nightmare distress. The psychometric properties of the Chinese version of NDQ (NDQ-CV) have been shown to be satisfactory in the general population of Chinese adolescents. This study aims to evaluate the psychometric properties of NDQ-CV in adolescents with psychiatric disorders. A total of 536 patients with psychiatric disorders aged 10–19 years old were recruited from Shandong Mental Health Center in China between October 2021 and March 2022. A structured questionnaire including NDQ-CV was used to measure nightmare distress, nightmare frequency, sleep duration, insomnia, daytime sleepiness, and depressive symptoms. Confirmatory factor analysis was performed to assess the factor structure of NDQ-CV in adolescents with psychiatric disorders. The mean age of the participants was 15.30 $\pm$ 1.95, and 61% was female. Fifty-two percent of participants were diagnosed with depressive disorder. Confirmatory factor analysis showed that the revised one-factor model was most suitable to interpret the structure of NDQ-CV. The internal consistency reliability coefficient was 0.94. The total scale

This article was published Online First January 9, 2025.
Deirdre Barrett served as action editor.
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This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors would like to thank Aihua Yin, Shumiao Liu, and Ludong Bai for their help with data collection. The authors are also grateful to the participants and their parents involved in this study for their collaboration. The authors have no conflicts of interest to disclose. This study was approved by the ethics committee of the Shandong Mental Health Center in China. All participants and their parents were informed of the study, and they consented to complete the questionnaires. This study was not preregistered. The data are not publicly available due to ethical and information governance restrictions.

Ziyang Wang served as lead for methodology, writing–original draft, and writing–review and editing and contributed equally to data curation, investigation, and resources. Lei Hu served as lead for conceptualization, data curation, investigation, project administration, resources, and supervision and served in a supporting role for writing–original draft. Yanyun Yang served as lead for software and contributed equally to methodology and writing–original draft. Xianchen Liu served in a supporting role for methodology, validation, and writing–original draft. Ziyang Wang and Yanyun Yang contributed equally to formal analysis and validation. Lei Hu, Yanyun Yang, and Xianchen Liu contributed equally to writing–review and editing.

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ISSN: 1053-0797
2025, Vol. 35, No. 3, 295–309
https://doi.org/10.1037/drm0000297

score was significantly correlated with nightmare frequency, gender, sleep duration, insomnia, daytime sleepiness, and depressive symptoms. Furthermore, there were significant differences in NDQ-CV total scores between adolescents with psychiatric disorders and the general adolescent population. The NDQ-CV has satisfactory reliability and validity and is suitable to assess nightmare distress in adolescents with psychiatric disorders. Further studies are needed to investigate the psychometric properties of NDQ-CV in clinical and healthy adult populations.

Keywords: nightmare distress, reliability, validity, adolescents, psychiatric disorder

Nightmares are usually described as vivid, disturbing dreams that could evoke one's fearful, dysphoric emotions and wake one up from sleep (Nielsen & Levin, 2007). Nightmares are prevalent among general and clinical populations (Abdel-Khalek, 2006; Akkaoui et al., 2020; Sheaves et al., 2016). The prevalence of weekly nightmares ranges from 4% to 10% in the general population (Levin & Nielsen, 2007). For patients with psychiatric disorders, the prevalence of weekly distressing nightmares could be up to 55% (Sheaves et al., 2015). Nightmares are more prevalent in children and adolescents (Abdel-Khalek, 2006; Schredl & Reinhard, 2011), and scary dreams reported by children exceed 80% (Muris et al., 2000). Almost half of the adolescents admitted to an inpatient psychiatric unit had clinically meaningful nightmare complaints (i.e., the Disturbing Dream and Nightmare Severity Index score $\geq$10; Kaplan et al., 2014). Nightmares not only have a negative impact on individuals' sleep (Krakow, 2006; Zhou et al., 2022) but are also related to mental health problems (Kammerer et al., 2021; Levin, 1998; X. Liu et al., 2022) and suicidal behavior(Geoffroy et al., 2022; X. Liu, Yang, et al., 2021). Various psychopathological problems are found to be associated with nightmares, such as paranoid thoughts, hallucinations, negative symptoms, hopelessness, attention, internalizing problems, and externalizing problems (Kammerer et al., 2021; Koopman-Verhoeff et al., 2019; X. Liu et al., 2022; Sheaves et al., 2016). Many studies have demonstrated that nightmares are associated with depression and suicide as well (Hedström et al., 2021; Lamis et al., 2018; X. Liu, Yang, et al., 2021).

Nightmare disorder is referred to recurrent, vivid, and highly dysphoric dreams that often result in awakening with anxiety (World Health Organization, 2019, 2024). Significant distress like anxiety caused by nightmares is an important criterion for the diagnosis of nightmare disorder. Nightmare distress, different from nightmare frequency, is a kind of emotional distress caused by nightmares that has an effect on waking psychological functioning (Levin & Nielsen, 2007). Nightmare distress is determined by nightmare frequency and other factors such as personality (e.g., neuroticism) and copying styles(Schredl & Goeritz, 2019). However, research has suggested that nightmare distress is associated with psychopathology more strongly than nightmare frequency (Blagrove et al., 2004; Roberts & Lennings, 2006) and nightmare distress mediates the association between nightmare frequency and mental health problems (X. F. Yang et al., 2022). Elevated nightmare distress predicts psychopathological problems and suicide (Agargun et al., 2007; Levin & Fireman, 2002; Sheaves et al., 2015, 2016). In a large adolescent sample, Liu et al. found that nightmare distress was significantly associated with suicidal behavior 1 year later, and depressive symptoms played a mediating role

(X. Liu, Yang, et al., 2021). Lee et al. found that nightmare distress fully mediated the association between nightmare frequency and suicidal ideation in undergraduate students (Lee & Suh, 2016). Similarly, nightmare distress was found to be a mediator between frequent nightmares and depressive symptoms in Chinese adolescents (X. F. Yang et al., 2022).

Nightmare distress could be measured from different aspects (Ağargün et al., 1999; Krakow et al., 2000; Russell et al., 2018), such as nightmare intensity, nightmare effects on social functioning, nightmare-related symptoms, and perception of nightmare distress (Böckermann et al., 2014). The Nightmare Distress Questionnaire (NDQ) is commonly used to assess nightmare distress (X. Liu, Liu, et al., 2021; Martínez et al., 2005; Suh et al., 2016). Although NDQ has good reliability and validity (Böckermann et al., 2014; Martínez et al., 2005), its construct validity Q is disputable and varies across studies. In a study of 162 university students, researchers found that NDQ showed trifactorial structure and identified three subscales as "preoccupation-fear," "interference," and "premonition" (Martínez et al., 2005). However, there were only 7% of the students with weekly nightmares in the study (Martínez et al., 2005). In another study of 213 individuals with weekly nightmares, "general nightmare distress," "impact on sleep," and "impact on daytime reality perception" were identified as another trifactorial structure (Böckermann et al., 2014). Both trifactorial structures explained 50%–55% of the total variance (Böckermann et al., 2014; Martínez et al., 2005). One recent study of 92 participants found that only the subscales "general nightmare distress" and "impact on sleep" demonstrated some evidence of convergent and divergent validities (Stieger & Kuhlmann, 2018). One randomized controlled trial used NDQ to assess nightmare distress for investigating the effects of imagery rehearsal therapy in patients with psychiatric disorders (van Schagen et al., 2015). Psychiatric patients reported more frequent nightmares (Akkaoui et al., 2020). Psychiatric medications have influence on patients' sleep rhythm and dream experience (Nicolas & Ruby, 2020). However, little is known about the psychometric properties of NDQ in psychiatric patients.

Recently, Liu and colleagues developed the NDQ—Chinese version (NDQ-CV) and demonstrated its psychometric properties in a large sample of Chinese adolescents (X. Liu, Liu, et al., 2021). Exploratory and confirmatory analyses showed that a two-factor model was most suitable for NDQ-CV, and the two factors were defined as nightmare general distress (NGD) and nightmare daytime reality perception (NDRP; X. Liu, Liu, et al., 2021). However, it is unknown whether the two-factor model is suitable for adolescents with psychiatric disorders. The objective of the study was to assess psychometric properties of NDQ-CV in Chinese adolescents with psychiatric disorders, including construct validity, internal consistency reliability, convergent validity, and discriminant validity.

Method

Participants and Procedure

We recruited 536 adolescent patients from the outpatient department of Shandong Mental Health Center (a public psychiatric hospital in Jinan, the capital and largest city of Shandong Province) in China between October 2021 and March 2022. All patients were diagnosed by psychiatrists with 5 years of clinical experience

based on the *International Statistical Classification of Diseases and Related Health Problems*, 10th edition, criteria. Inclusion criteria are adolescents aged from 10 to 19 years old and diagnosed with psychiatric disorders. Patients who had severely impaired cognitive function and were unable to read or answer the questions were excluded from this research.

A research clinician administered a structured questionnaire to participants to collect data. Before filling out the questionnaires, all participants were told that participation in the study was voluntary, and their answers were confidential. Oral informed consent was obtained from participants and their parents or guardians. It took 10–20 min to complete the questionnaire. The ethics committee of the Shandong Mental Health Center approved this study.

Measures

NDQ-CV

NDQ-CV is a 14-item scale developed from NDQ, a 13-item scale evaluating waking emotion distress caused by nightmares (Belicki, 1992; X. Liu, Liu, et al., 2021). In the NDQ-CV, Item 8 "Do nightmares affect your well-being?" in NDQ was changed to "Do nightmares affect your academic/job performance?". One item, "Are you ever upset/distressed by your nightmares?" was added to assess general nightmare distress. Response to each item was also changed to a 5-point scale from 1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, to 5 = *always*. NDQ-CV has a good internal consistency reliability (coefficient $\omega = .9$) and validity (X. Liu, Liu, et al., 2021). The total score of NDQ-CV ranges from 14 to 70. The higher the score, the higher the nightmare distress.

Nightmare Frequency

Nightmare frequency was evaluated by the question "During the past month, how often did you have nightmares at night? Nightmares are defined as vivid dreams that evoked anxiety, fear, or terror and woke you up from sleep." Responses were "never," "occasionally or less than once a week," "once or twice a week," "three to four times a week," "five to six times a week," and "almost every night."

Sleep Duration on Weekdays and Weekends

Adolescents have significantly different sleep duration on weekdays and weekends (X. Liu et al., 2008). Sleep duration was assessed by the questions "During the past month, how many hours did you actually sleep on weekdays?" and "During the past month, how many hours did you actually sleep on weekends?"

Insomnia Symptoms

The Youth Self-Rating Insomnia Scale was used to assess insomnia symptoms in participants. The Youth Self-Rating Insomnia Scale is an eight-item scale. It has demonstrated adequate internal consistency reliability (coefficient $\alpha = .80$), 2-week test–retest reliability (correlation coefficient = .82), and concurrent validity (X. C. Liu et al., 2019). Each item is rated on a 5-point scale from 1 = *very good* to 5 = *very poor*. The total score ranges from 8 to 40, and the higher score indicates more insomnia symptoms.

Daytime Sleepiness

The Chinese Adolescent Daytime Sleepiness Scale was applied to evaluate daytime sleepiness in participants. It contains seven items and has satisfactory internal consistency reliability (coefficient $\alpha = .89$) and 2-week test–retest reliability (correlation coefficient = .77; X. C. Liu et al., 2017). Every item was answered on a 5-point scale in which 1 = *never*, 2 = *less than once a week*, 3 = *once or twice a week*, 4 = *three to five times a week*, and 5 = *six or seven times a week*. The Chinese Adolescent Daytime Sleepiness Scale score ranges from 7 to 35. The higher score means more daytime sleepiness.

Depressive Symptoms

Depressive symptoms were assessed by the Chinese version of the Center for Epidemiologic Studies Depression Scale. It has been widely used to evaluate depressive symptoms in diverse populations (H. J. Yang et al., 2004; Zhu et al., 2021). It consists of 20 items, and each item is rated on a 4-point scale, in which 0 = *rarely or less than 1 day*, 1 = *some of the time or 1–2 days*, 2 = *a moderate amount of the time or 3–4 days*, and 3 = *most or all of the time or 5–7 days*. Sixteen of the items measure negative symptoms in participants (e.g., "I felt lonely" and "I felt depressed"), and the other four items measure positive symptoms (e.g., "I enjoyed life" and "I was happy").

Statistical Analysis

All outpatients who completed the questionnaire were included in the analysis. Means and standard deviations for NDQ-CV items were reported. Interitem correlations and item-total correlations were calculated. We divided participants into a high NDQ-CV scale score group ($n = 147$) and a low score group ($n = 148$). The high score group was patients with top 25th percentile of the total scale score and the low score group was those with bottom 25th percentile of total scale score. Independent *t* tests between the two groups were then performed to examine item discrimination.

Confirmatory factor analysis (CFA) was conducted to examine the factor structure of the scale. The two-factor CFA model found in X. Liu, Liu, et al., (2021) based on the general adolescent population was conducted to examine whether the model was adequate for the psychiatric outpatient population. Specifically, Items 10, 11, 12, and 13 were hypothesized to measure the NDRP factor and the other 10 items measured the NGD factor. Given that all items were moderately to highly related, we also conducted a one-factor model for comparison purposes. Because item scores were ordinal with five response categories and the distributions of item scores were asymmetric, the models were conducted based on polychoric correlations using an unweighted least squares estimation method with mean and variance adjustment (B. Muthén et al., 1997).

Internal consistency reliability was computed using coefficient omega and coefficient alpha for the NDQ-CV scale. We computed correlations between the NDQ-CV scale and nightmare frequency, gender, sleep duration on weekdays and weekends, insomnia, daytime sleepiness, and depressive symptoms. Analysis of variance and nonparametric test were performed to examine the difference of NDQ-CV scores across different nightmare frequency and gender. We compared the NDQ-CV total scores between the current psychiatric sample and a sample of 11,831 adolescents in middle and high schools in a previous study (X. Liu, Liu, et al., 2021).

Independent *t* test and nonparametric test were used to examine the discriminant validity of NDQ-CV. CFA models were conducted using Mplus 8 (L. K. Muthén & Muthén, 1998–2021). All other statistical analyses were performed using SPSS 25.00.

Results

Sample Characteristics

A total of 536 participants were included in the study. The mean age of all participants was 15.30 ± 1.95, 61% was female. Most participants had an education level of junior or senior high school (89.7%) and lived together with their parents (82.5%). About half of the participants (52.0%) were diagnosed with depressive disorder including first episode and recurrence, and 82.6% were on psychiatric medications when completing the questionnaire. Other details of sample characteristics are shown in Table 1.

NDQ-CV Total Scores and Item Analysis

Figure 1 shows the distribution of the NDQ-CV total scores in psychiatric outpatients. The total scores of NDQ-CV were not normally distributed (Kolmogorov–Smirnov = 0.114 $p < .001$; Shapiro–Wilk = 0.928, $p < .001$; skewness = 0.717, $SE =$ 0.106; kurtosis = −0.271, $SE = 0.212$). The mean of total scores was 29.92 ± 13.22, and the median score was 27. The total scores ranged from 14 to 70, and the 25th, 50th, 75th, and 95th percentiles were 18, 27, 39, and 56, respectively. According to NDQ-CV total score >40 as the cutoff for clinically meaningful nightmare distress (X. Liu, Liu, et al., 2021), 22.8% of the sample had clinically meaningful nightmare distress.

Table 2 presents the descriptive characteristics of NDQ-CV items. About 70% of adolescents with psychiatric disorders were distressed by nightmares, more than 60% had difficulty putting nightmares out of their mind, avoided or disliked or feared someone in nightmares, had difficulty falling back asleep after waking up from nightmares, and had disturbed sleep quality due to nightmares. Over half of the patients had difficulties coping with nightmares and were interested in therapy. However, about 80% of adolescents with psychiatric disorders had never considered seeking professional help for nightmares.

As shown in Table 3, the polychoric correlations between items ranged from .32 to .88, and most correlations were moderate to high, indicating the existence of a dominant factor. Moderate to high polyserial correlations were found between each item and total scale scores, ranging from .64 to .84. The polyserial correlations between each item and total scale scores with item deleted were also moderate to high (.58–.84). Independent *t* test showed significant difference of each item scores between the high score group and the low score group (seen in Table 4).

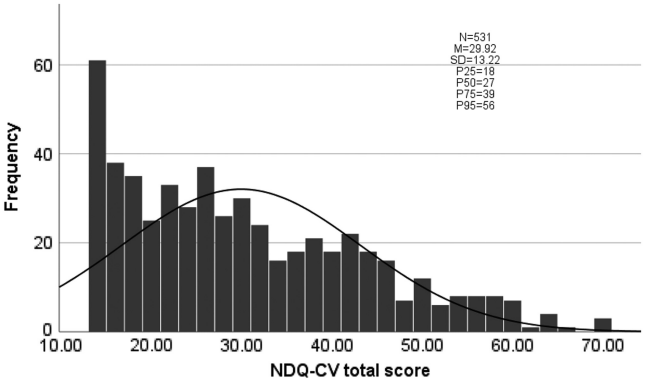
CFA

The two-factor model fit the data reasonably well, $\chi^2(76) = 324.73$, $p < .01$, root-mean-square error of approximation (RMSEA) = .078, comparative fit index (CFI) = .973, and standardized root-mean-square residual (SRMR) = .040.

Table 1
Sample Characteristics

Demographic information	*N*	%/*M*
Sex		
Male	207	38.60
Female	327	61.00
Missing	2	0.40
M_{age} (*SD*)	536	15.3 (1.95)
Education		
Elementary school	29	5.40
Junior high school	222	41.40
Senior high school	259	48.30
College	26	4.90
Family economic status		
Very good	9	1.70
Good	85	15.90
Fair	383	71.50
Bad	44	8.20
Very bad	10	1.90
Missing	5	0.90
Parental marital status		
Very harmonious	98	18.30
Harmonious	153	28.50
Sometime conflicts	171	31.90
Frequent conflicts	53	9.90
Separated	9	1.70
Divorced	46	8.60
One parent passed away	5	0.90
Missing	1	0.20
Living with parents		
Yes	442	82.50
Living on campus	55	10.30
Living with relatives	9	1.70
Other	30	5.60
History of psychiatric disorders		
<1 month	89	16.60
1 month	69	12.90
3 months	65	12.10
6 months	113	21.10
1 year	167	31.20
≥3 years	32	6.00
Missing	1	0.20
History of hospitalization		
0	321	59.90
1	158	29.50
2	48	9.00
3	6	1.10
4	1	0.20
5	2	0.40
Current psychiatric disorders		
Depressive disorder	279	52.10
Bipolar affective disorder	47	8.80
Anxiety disorder	35	6.50
Schizophrenia	32	6.00
Obsessive-compulsive disorder	48	9.00
Dissociative disorder	48	9.00
Behavioral and emotional disorders of childhood and adolescence	17	3.20
Unspecified mental disorder	30	5.30
Current psychiatric medications		
No	91	17
Yes	443	82.60
Missing	2	0.40

Figure 1
NDQ-CV Total Score Distribution in Adolescents With Psychiatric Disorders



Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire; P25 = quartile; P50 = median; P75 = third quartile; P95 = 95% quantile.

The standardized loadings ranged from 0.68 to 0.91 for the items loaded on the NGD factor and ranged from 0.70 to 0.87 for the items loaded on the NDRP factor. The two factors were highly correlated ($r = .87$), indicating that the two factors were not distinct. The one-factor model yielded a worse fit, $\chi^2(77) = 407.12$, $p < .01$, RMSEA = .089, CFI = .964, and SRMR = .046, than the two-factor model with a chi-square difference test statistic

Table 2
Descriptive Statistics of NDQ-CV Items in Psychiatric Outpatients

Question	*N*	Response (%)				
		1	2	3	4	5
1. Are you ever upset/distressed by your nightmares?	536	30.4	24.4	24.4	11.2	9.5
2. When you awaken from a nightmare, do you find you keep thinking about it and have difficulty putting it out of your mind?	536	21.1	24.1	24.8	15.1	14.9
3. Do you ever find yourself avoiding or disliking or fearing someone because they were in your nightmare?	535	35.1	21.5	19.6	10.4	13.2
4. Are you ever afraid to fall asleep for fear of having a nightmare?	535	58.0	17.4	11.6	7.1	5.8
5. After you awaken from a nightmare, do you have difficulty falling back asleep?	535	39.0	22.4	18.8	9.7	9.9
6. Do nightmares interfere with the quality of your sleep?	535	35.1	22.2	17.5	11.0	14.0
7. Do you have difficulties coping with nightmares?	535	47.4	22.2	12.3	8.6	9.3
8. Do you feel you have a problem with nightmares?	536	56.7	19.8	10.3	5.6	7.6
9. Do nightmares affect your academic/job performance?	536	55.6	19.8	13.4	4.5	6.7
10. Do you ever have the feeling that something which happened in your nightmare has really occurred?	535	52.8	20.7	16.8	4.7	4.9
11. Do your nightmares foretell the future?	536	61.0	17.7	12.5	4.5	4.3
12. When you have a nightmare, does it ever seem so real that when you awaken you have difficulty convincing yourself it is "just a dream"?	536	41.0	16.2	16.8	10.6	15.3
13. In the past year have you considered seeking professional help for your nightmares?	536	79.9	8.0	5.0	3.4	3.7
14. If a therapy program were available which might help you control, or to stop having nightmares, how interested would you be in participating?	536	47.8	14.2	14.2	7.6	16.2

Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire; 1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, and 5 = *always*.

Table 3
Means, Standard Deviations, and Polychoric Correlations of NDQ-CV Items

Item	*M* (*SD*)	*r*1[a]	*r*2[b]	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2.44 (1.29)	.82	.78	—												
2	2.79 (1.34)	.77	.71	.71	—											
3	2.46 (1.40)	.78	.73	.65	.67	—										
4	1.85 (1.22)	.76	.71	.68	.60	.61	—									
5	2.29 (1.34)	.73	.68	.58	.60	.63	.65	—								
6	2.46 (1.42)	.84	.81	.73	.64	.66	.71	.72	—							
7	2.11 (1.33)	.84	.81	.75	.61	.66	.73	.67	.81	—						
8	1.88 (1.26)	.86	.84	.77	.61	.64	.71	.63	.80	.86	—					
9	1.86 (1.20)	.83	.80	.70	.60	.66	.66	.63	.77	.79	.88	—				
10	1.88 (1.15)	.64	.58	.52	.54	.59	.32	.42	.45	.49	.51	.52	—			
11	1.74 (1.11)	.65	.59	.51	.52	.57	.41	.44	.46	.52	.52	.51	.71	—		
12	2.44 (1.49)	.79	.73	.67	.68	.63	.55	.57	.62	.65	.67	.64	.63	.62	—	
13	1.43 (0.99)	.69	.63	.64	.52	.50	.56	.44	.53	.57	.65	.62	.50	.45	.56	—
14	2.30 (1.51)	.69	.62	.56	.50	.48	.55	.50	.61	.59	.65	.57	.39	.44	.53	.50
Total	29.92 (13.22)															

Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire.
[a] Polyserial correlation between each item and total scale score, all *r*s were significant. [b] Polyserial correlation between each item and total scale score with item deleted, all *r*s were significant.

Table 4
Discriminations Between NDQ-CV Items

Item	*t*	*p*
1	−27.30	<.001
2	−26.94	<.001
3	−25.46	<.001
4	−18.15	<.001
5	−21.39	<.001
6	−34.03	<.001
7	−25.05	<.001
8	−23.93	<.001
9	−20.97	<.001
10	−14.67	<.001
11	−13.15	<.001
12	−29.23	<.001
13	−9.17	<.001
14	−18.32	<.001

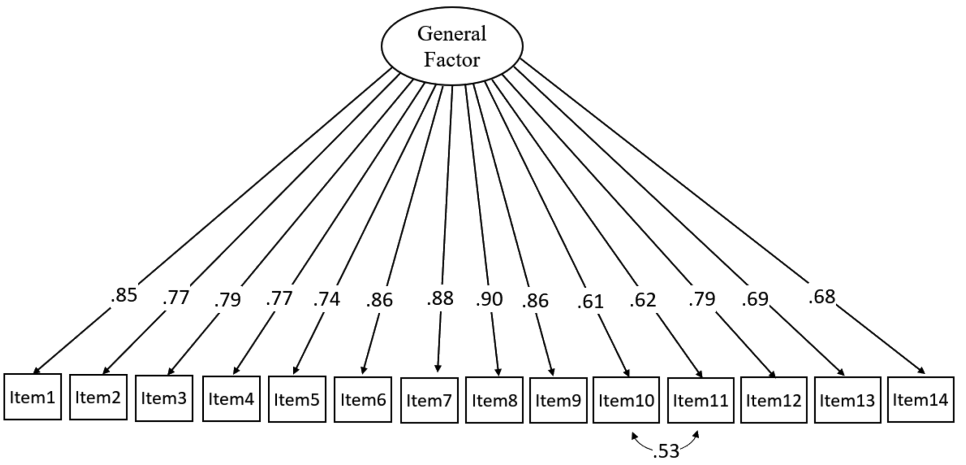
Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire.

of 41.71 ($df = 1$, $p < .01$). Modification indices suggested adding a correlated error between item#10 and item#11, both of which were included in the original NDRP factor. The revised one-factor model with the correlated error yielded an adequate fit, $\chi^2(76) = 300.38$, $p < .01$, RMSEA = .074, CFI = .975, and SRMR = .039, and was chosen as the final model. As shown in Figure 2, standardized factor loadings on the common factor were large, ranging from 0.61 (Item 10) to 0.90 (Item 8). The error correlation was .53.

Internal Consistency Reliability

We computed both coefficient omega and Cronbach's alpha. The coefficient ω of total scale scores was .94. And Cronbach's α was .932 for the total scale scores.

Figure 2
Standardized Parameter Estimates of the One-Factor Model With a Correlated Error for NDQ-CV



Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire.

Convergent Validity

NDQ-CV was significantly correlated with nightmare frequency, gender, sleep duration on weekdays, insomnia, daytime sleepiness, and depressive symptoms but was not significantly correlated with sleep duration on weekends. As shown in Table 5, the correlation between total scale scores and sleep duration on weekdays was negative and weak. Nightmare frequency, insomnia, daytime sleepiness, and depressive symptoms were all positively and moderately correlated with the total scale score. Analysis of variance and Kruskal–Wallis test showed significant differences in total scale scores across nightmare frequency and gender. NDQ-CV scores increased with more frequent nightmares. Girls tended to report higher NDQ-CV total scores than boys.

Discriminant Validity

The mean total score of NDQ-CV was 22.47 $\pm$ 8.70 and the median score was 20.00 in a large sample of adolescents in middle and high schools (X. Liu, Liu, et al., 2021). Independent *t* test showed a significant difference in mean NDQ-CV scores between adolescents with psychiatric disorders (29.92 $\pm$ 13.22) and general population of adolescents ($t = 12.978, p < .001$). Nonparametric test showed a significant difference in median NDQ-CV scores between patients with psychiatric disorders ($Mdn = 27.00$) and general population of adolescents (Wilcoxon signed-rank test = 115,017.000, $p < .001$).

Discussion

NDQ-CV showed satisfactory psychometric properties in a previous study with a large sample of Chinese adolescents (X. Liu, Liu, et al., 2021). In the current study, this scale demonstrated good psychometric properties in psychiatric adolescents.

Table 5
NDQ-CV Scale Scores by Nightmare Frequency and Gender and Their Correlations With Sleep and Depression

Variate	*N*	*M* (*SD*)	*F*[a]	*r*	*p*
Nightmare frequency	525		101.57	.705	<.001[b]
Never	108	19.06 (7.07)			
Occasionally or less than once a week	165	24.13 (8.27)			
Once or twice a week	90	32.11 (10.46)			
Three to four times a week	88	38.74 (11.21)			
Five to six times a week	23	45.35 (10.38)			
Almost every night	51	46.75 (11.69)			
Gender	529	29.95 (13.23)	46.277	.286	<.001[b]
Boys	204	25.22 (10.89)			
Girls	325	32.93 (13.70)			
Sleep duration on weekdays	531			−.114	.008[b]
Sleep duration on weekends	531			−.062	.153
Insomnia	528			.572	<.001[b]
Daytime sleepiness	528			.397	<.001[b]
CES-D	406			.611	<.001[b]

Note. NDQ-CV = Chinese version of Nightmare Distress Questionnaire; CES-D = Center for Epidemiologic Studies Depression Scale.
[a] All *F*s were significant ($p < .001$). [b] The statistical analysis was significant.

The mean score and median score of NDQ-CV were significantly higher in psychiatric adolescents than in general population of adolescents. This indicates that psychiatric adolescents were more distressed by nightmares, which is in accordance with the association between nightmare distress and psychopathological problems (Belicki, 1992; Levin & Nielsen, 2007). Interitem correlation was moderate to large, and scores on individual items were moderately to highly correlated with the total scale score ($r = .58–.84$). Significant differences in item scores between the high-scale score group and the low-scale score group suggested good discriminate validities of NDQ-CV items.

Results from the CFA indicated the revised one-factor model with the correlated error was more suitable in psychiatric patients, which was different with the two-factor model found in general adolescent population (X. Liu, Liu, et al., 2021). Standardized loadings were all large (>0.61). Coefficient ωs was .94 and coefficient αs was .93 for the NDQ-CV total scale scores. They were all higher than those found in general adolescent population (X. Liu, Liu, et al., 2021), which suggests that NDQ-CV scale scores all had satisfactory internal consistency reliability in psychiatric adolescents.

Convergent validity was supported by moderate and positive correlations between NDQ-CV total scale scores and nightmare frequency, insomnia, daytime sleepiness, and depressive symptoms. Previous studies also found NDQ total scale was positively associated with anxiety (Böckermann et al., 2014; X. Liu, Liu, et al., 2021). We found sleep duration was negatively correlated with NDQ-CV scale scores. Negative correlations were also found in the general populations of adolescents (X. Liu, Liu, et al., 2021). Consistent with previous studies (e.g., Schredl et al., 2021), gender is associated with nightmare distress. Female participants tended to report more nightmare distress than male participants, possibly because females are more vulnerable to anxiety, depression, and\sexual and physical abuse (Levin & Nielsen, 2007). Belicki et al. reported a correlation of .26 between nightmare frequency and NDQ scale scores. Liu et al. found that the correlation between nightmare frequency and NDQ-CV total scores was .34. Our study found the correlation was .705, which is much higher than those in previous studies. This may be because frequent nightmares are more likely to cause more nightmare distress in patients with psychiatric disorders than in other populations.

The current study found that NDQ-CV could differentiate nightmare distress between patients with psychiatric disorders and general population of adolescents. This may be because nightmares are considered a symptom of psychiatric disorders and are associated with psychopathological traits (Levin & Nielsen, 2007). NDQ-CV has been used in Chinese adolescents to assess nightmare distress (Zhang et al., 2023; Zhou et al., 2022). One study used NDQ-CV to measure nightmare distress in adolescent patients with major depressive disorder (Song et al., 2022). However, no study has evaluated the psychometric properties of NDQ-CV in adolescents with psychiatric disorders. The current study supports that NDQ-CV has satisfactory reliability and validity in assessing nightmare distress in adolescents with psychiatric disorders.

There are some limitations in this study. First, the participants were all adolescents with psychiatric disorders. We do not know whether NDQ-CV has good psychometric properties in adults with psychiatric disorders. Further studies are needed to investigate the psychometric properties of NDQ-CV in adult clinical and healthy population. Second, the participants were outpatients from Shandong Mental Health Center in China, and thus may not represent adolescent patients in other areas.

Third, previous studies found that trauma and neuroticism are also associated with nightmare distress (Schredl et al., 2021). However, our study did not assess these factors. Fourth, NDQ-CV is a self-reported frequency scale to measure nightmare distress. The scale suffers from self-reporting bias and cannot be used for clinical diagnosis of nightmare disorder. Further research is needed to validate the scale in patients with nightmare disorder.

Conclusion

The NDQ-CV has satisfactory reliability and validity in adolescents with psychiatric disorders. Further studies are needed to investigate the psychometric properties of NDQ-CV in adults with psychiatric disorders.

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