Cyber Dating Abuse Victimization and Sleep Quality Among Chinese Female Adolescents: Using Shattered Assumptions Theory

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Abstract

From the perspective of shattered assumption theory (SAT), the current study explored how cyber dating abuse victimization (CDAV) is related to sleep quality through the mediating roles of personal and general belief in a just world (PBJW and GBJW) and self-esteem among Chinese female adolescents. A total of 420 Chinese female adolescents were included and administered multiple scales, including the CDA questionnaire, BJW scale, Rosenberg self-esteem scale and Chinese version of the Pittsburgh Sleep Quality Index. The results indicated that almost half of girls (49%) reported that they had experienced CDA in the past year. CDAV was revealed to be positively linked with poor sleep quality, PBJW, GBJW, and self-esteem mediated this association, respectively. Besides, there was an indirect path from CDAV to sleep quality through the sequential mediating roles of PBJW and self-esteem. However, GBJW and self-esteem could not mediate the link between CDAV and sleep quality sequentially. That is to say, PBJW was a better predictor of self-esteem than GBJW. These results provide a first insight into the association between CDAV and sleep quality among Chinese female adolescents from the perspective of SAT. More attention should be given to improve female adolescents world assumptions, self-assessment and sleep problems after being abused.

Keywords

Cyber Dating Abuse Victimization; Belief in a Just World; Self-Esteem; Sleep Quality.

1. Introduction

Starting a romantic relationship is a normal developmental task during adolescence (individuals aged 11-18 years), which is conducive to adolescents' well-being [1]. Adolescence is a challenging period for most people, especially pertaining to romantic relationships. Teen dating violence is quite universal and may be aggravated owing to the widespread use of communication technologies [2]. In fact, most Chinese adolescents (about 93.1%) own at least one personal electronic device, and instant messaging is one of the most widely used functions. Instant messaging can promote intimacy but also provides fertile ground for cyber dating abuse victimization (CDAV; 3). Studies have reported that CDAV is more prevalent than offline dating violence victimization among adolescents (4), and that they are more likely to experience CDAV than adults (5).

Borrajo et al. (6) stated that CDAV includes direct aggression victimization (e.g., threatening and insulting messages sent by partners or ex-partners via social networks) and cyber control victimization (e.g., checking electronic accounts to monitor chatting records without permission by partners or ex-partners). Research has revealed that the prevalence of CDAV ranges from 14–94.8% (6, 7). Additionally, numerous studies have consistently concluded that girls, compared to boys, are more likely to experience CDAV (8, 9). In addition to the high prevalence of CDAV among female adolescents, its adverse effect on mental and physical health is sobering. CDAV is associated with increased risk behaviors (e.g., alcohol use, substance use,

sexual behaviors), emotional problems (e.g., depression, post-traumatic stress disorder, anxiety), and fear of partners, especially for female adolescents (10-12).

Sleep problems during adolescence have deleterious effects on the overall physical and mental well-being of adolescents (13, 14). Studies have associated peer victimization with poor sleep quality among adolescents (e.g., 15-17). Cava et al. (18) noted that being victimized by peers is highly related to being a victim of dating violence in adolescence. More importantly, McNaughton Reyes et al. (19) indicated that girls who were dating victims reported greater depressive symptoms, anxiety, heavy alcohol use, and less close friends than those victimized by peers. In many aspects, romantic relationships are a special type of peer relationship during adolescence (20). Involvement in negative intimate relationships is likely to lead to more severe outcomes (e.g., poor sleep quality) as compared to negative peer relationships. However, the absent exploration of the relationship between CDAV and sleep quality may fail to capture the particular configuration of intimate violence experiences to predict female adolescents' sleep problems. Additionally, typological perspectives on violence suggest that those who experience multiple forms of direct dating violence (e.g., verbal and physical aggression) in conjunction with monitoring behavior may be at greater risk for negative psychosomatic problems as compared to those who experience a single form of dating violence (21). Therefore, this study examined the overall effect of direct aggression victimization and cyber control victimization of CDAV on sleep quality among female adolescents. We further expand on this research by investigating how involvement in CDAV predicts sleep quality—namely, the mediation in this association.

Shattered assumptions theory (SAT; 22) posits that traumatic life events can shatter a person's assumptions about life and themselves and lead to negative outcomes such as poor sleep quality (23). Additionally, according to the cognitive–behavioral model of insomnia (24), maladaptive cognitive and behavioral responses induced by precipitating factors can increase sleep problems and exacerbate insomnia. Within these theoretical perspectives, we situate belief in a just world (BJW) and self-esteem as two cognitive–individual factors and assumptions about life and self that can mediate the association of CDAV with female adolescents' poor sleep quality..

1.1. CDAV and sleep quality

Adolescents' sleep quality is closely related to victimization experiences (16, 25). Specifically, the presence of CDAV causes emotional harm to victims and fosters poor sleep quality (26). Quality sleep needs the brain to temporarily reduce its sensitivity to external stimuli (27). CDAV may trigger female adolescents' fear, rumination, and hopelessness (28, 29), thus hindering relaxation and sleep. From a neurophysiological perspective, the emotional pressure associated with CDAV activates the activities of the prefrontal cortex and amygdala—brain areas that are accountable for quality sleep; abnormalities in these brain regions are often related to frightening dreams and sleep disruptions (30). Empirical evidence indicates that online dating abuse may lead to more harm to victims than its offline form, as online contact is more accessible, unlimited by space and time, and one does not have to be physically present (9). The lack of victims' nonverbal responses may decrease perpetrators' empathy and behavioral inhibitions (31). Nevertheless, few studies have addressed the sleep problems of female adolescents who experienced CDAV. We considered female adolescents' internal cognitive mechanisms (i.e., BJW and self-esteem) to strengthen our understanding of the link between CDAV and poor sleep quality, thus offering some new ideas for intervention and prevention.

1.2. The parallel mediating roles of BJW and self-esteem

The cognitive–behavioral model of insomnia notes that maladaptive cognitive–individual factors are related to poor sleep quality (24). BJW and self-esteem are important cognitive–individual factors; thus, there may be correlations between BJW and self-esteem and sleep

quality. Additionally, individuals who experienced victimization are likely to show cognitive biases (32, 33). Therefore, we expect that CDAV would affect BJW and self-esteem, and give rise to sleep problems.

SAT shows that individuals have cognitive assumptions about themselves and the world. These assumptions guide individuals to design, set up the target, and organize their actions (34). When individuals experience traumatic victimization, these assumptions are attacked and called into question. People's assumptions are shattered by victimization experiences, further leading to traumatic reactions such as suicidal ideation, negative emotional well-being, and social anxiety (23, 35,36). According to Janoff-Bulman and Frieze (22), most people share three common assumptions about vulnerability to traumatic events: first, individuals usually do not believe that something terrible is possible for them (i.e., personal invulnerability); second, they view the external world as meaningful, manageable, and just (i.e., meaningful world); and, finally, they hold positive self-evaluation tendencies (i.e., valuable self).

BJW refers to individuals' belief that they live in a world where people usually get what they deserve, which includes personal BJW and general BJW (37). These beliefs guarantee the safety and stability of human existence. Thus, the two forms of BJW closely resemble the personal invulnerability (i.e., personal BJW) and meaningful world (i.e., general BJW) assumptions of SAT. CDAV can be regarded as a traumatic event for female adolescents, as it causes extensive emotional and behavioral impacts on victims, even suicidal ideation and attempts (11, 38).

Considering SAT, CDAV may shatter female adolescents' understanding of the distributional principles of justice. Empirical evidence has established a relationship between higher cyberbullying victimization and lower general BJW and personal BJW (35, 39). Wang et al. (40) found that parental disfavoritism significantly lowers girls' personal BJW as compared to boys. Thus, negative life events, such as CDAV, may be an essential antecedent for lower general BJW and personal BJW (41).

Additionally, the two dimensions of BJW are closely related to sleep quality, as BJW help reduce thoughts before sleep and has a positive effect on sleep quality (42). The adaptive function of BJW posits that individuals with a strong BJW are likely to dilute or rationalize injustices and ascribe them meaning in a just framework (43). Conversely, individuals with weak BJW experience hold more negative emotions (e.g., anger, fear, and rumination) in the face of traumatic events. Excessive interpretation of stressful events may cause female adolescents to ruminate consistently before bed, which results either in difficulties falling asleep or sleep interruption. Thus, it is logical to propose that BJW could mediate the association of CDAV with poor sleep quality. It is predicted that the link between CDAV and poor sleep quality would be mediated by PBJW and GBJW separately.

Self-esteem involves people's overall evaluation of their value, strengths and importance, which is the core component of self-concept and has an important impact on the development of individual behavior (44). According to SAT, experiences of CDAV may increase victims' self-doubt and self-depreciation (45), and attribute the harm to their own mistakes and shortcomings. CDAV is a sign of exclusion, unacceptability, and disrespected, which hampers victims' self-recognition and results in low levels of self-esteem (46). More importantly, in the literature on intimate violence, the relationship between victimization and shame is often linked (47, 48). Shame is a negative emotion related to self-underestimation, which harms victims' sense of self-worth and may be the leading cause of low self-esteem (49). Direct evidence indicates that reduced self-esteem is closely related to increased sleep problems (50, 51). Additionally, sleep problems can always coexist with depression (52, 53), and individuals' negative self-perception and self-evaluation (i.e. low self-esteem) are the key susceptibility factors of depression (54). Thus, it is logical to propose that self-esteem could mediate the association between CDAV and poor sleep quality.

1.3.   The serial mediation of BJW and self-esteem

BJW may also be linked with self-esteem (55). We expected that there would be an indirect path from CDAV to poor sleep quality through personal BJW/general BJW and self-esteem sequentially. Studies have demonstrated that self-esteem is positively related to personal BJW and general BJW, and an unjust belief toward oneself or the world may be an important cause of low self-esteem (55,56). On the one hand, high self-esteem means that a person feels that they are valuable and worthy of respect. Conversely, female adolescents who experience CDAV will display lower levels of personal BJW, as they tend to feel that they have not been treated fairly and respected by their partner. Accordingly, low personal BJW damages victims' positive self-evaluation and further decrease their self-esteem (57). On the other hand, the more one holds general BJW views, the more obligatory the personal contract is. It guides people to seek justice through acting in an impartial manner (58). Individuals' just behavior is likely to increase their positive attitude toward oneself; however, if the general BJW is shattered by unfair events, the level of self-esteem is significantly reduced (59).

Taken together, when female adolescents are victimized by their partners, their SAT assumptions are challenged, thus resulting in psychological reactions such as sleep problems. The assumption of BJW is particularly shattered by victimization. Personal BJW assumption entails that individuals may underestimate the chance of bad things happening to them, and general BJW is based on the belief that the world is meaningful and that events are controllable. Nevertheless, when female adolescents experience CDAV, both forms of BJW are shattered. They may see themselves in the role of a victim in a world that does not make sense anymore. Those who experienced CDAV and hold low levels of BJW are likely to consistently ruminate upon the related-victimization events (e.g., "why me") or believe that these events were unfair, which further triggers negative evaluations about themselves (55). Ruble et al. (60) noted that women tend to be more pessimistic and that they show more maladaptive attributions for victimization experiences, which prevents them from feeling content with themselves and their performance as compared to those who have not been victimed. Thus, reduced BJW is a risk factor that is detrimental for self-esteem. Moreover, disturbances in self-esteem are believed to contribute to the high prevalence of stress symptoms and ill-health that play a crucial role in the development of sleep problems by increasing the risk of psychological and physiological exhaustion (61). Therefore, it is likely that female adolescents exposed to CDAV may lower their PBJW/GBJW and further self-esteem, and eventually put them at a higher risk of sleep problems.

1.4.   The current study

This study contributes to the existing literature in several ways. First, although ample research has examined perpetration and CDAV in Western societies, additional studies are needed to represent this phenomenon in non-Western countries. This study provides a preliminary description of CDAV in Chinese female adolescents. Second, researchers have focused on the link between CDAV and victims' psychological problems; however, the effect of CDAV on physiological aspects has been largely overlooked. Moreover, an integrative theoretical interpretation of these relationships is lacking. This study explored how CDAV may affect victims' sleep quality from the perspectives of SAT and cognitive–behavioral models of insomnia and sought to offer a new explanation mechanism through the role of BJW and self-esteem.

To fill existing research gaps, based on the SAT and cognitive–behavioral models of insomnia, we hypothesized that more CDAV is related to poorer sleep quality (H1); personal BJW mediates the link between CDAV and poor sleep quality (H2); general BJW mediates the link between CDAV and poor sleep quality (H3); self-esteem mediates the link between CDAV and poor sleep quality (H4); personal BJW and self-esteem mediate the link between CDAV and poor

sleep quality sequentially (H5); and general BJW and self-esteem mediate the link between CDAV and poor sleep quality sequentially (H6). The proposed model is shown in Figure 1.

2. Methods

2.1. Participants

Convenience sampling from seven public high schools in China was used to collect the data. Initially, a total of 710 questionnaires were obtained. Female adolescents were asked to respond to all items regarding demographic information, CDAV, BJW, self-esteem, and sleep quality. Seventy-seven respondents' data were deleted owing to some items (30–50%) not being answered. The participants were required to provide information about whether they had been in at least one romantic relationship in the past year. According to this criterion, data from 213 respondents were not included in the formal analysis. Therefore, the final sample comprised 420 female adolescents.

The results of a Monte Carlo power analysis for mediation models (Schoemann et al., 2017) showed that this sample size was adequate to obtain a statistical power exceeding 80% for detecting the hypothesized indirect effect. In the final sample, the participants' ages ranged from 13 to 17 years (mean = 15.78 ± .56 years). Of them, 212 (50.5%) were an only child and 208 (49.5%) had siblings. There were 246 (58.6%) participants from rural areas and 174 (41.4%) from urban areas. They reported spending approximately 2.88 hours a day on online activities.

2.2. Measures

2.2.1. CDAV

The victimization dimension of the Cyber Dating Abuse questionnaire (6) was used. The participants responded to 20 items on a six-point scale (1 = never and 6 = usually; sample item: "My partner or former partner wrote a comment on a wall of a social network to insult or humiliate me"). The scale measures the frequency of each behavior in the last year. A higher average score for all items is related to more experience of CDAV. The results of a confirmatory factor analysis showed that the scale has a good fit: $\chi2/df$ = 4.689, $p < .001$, RMSEA = 0.068, GFI = 0.96, IFI = 0.95, CFI = 0.95. The Cronbach's α coefficient of this scale was .84 in this study, which indicates good internal consistency.

2.2.2. BJW

The BJW scale compiled by Dalbert (37) was used. The scale contains two sub-scales: personal BJW and general BJW; the former has seven items (e.g., "Overall, events in my life are just") and the latter contains six items (e.g., "I think the world is basically a just place"). Each item was scored on a six-point Likert scale from 1 (strongly disagree) to 6 (strongly agree). A higher average score for all items is related to stronger BJW. In this study, the Cronbach's αs of personal BJW and general BJW were .92 and .90, respectively, thus indicating excellent internal consistency.

2.2.3. Self-esteem

The Rosenberg Self-esteem Scale (Rosenberg, 1989) was used, which measures an individual's sense of self-worth and self-acceptance. The scale comprises 10 items (e.g., "In general, I am satisfied with myself"), and participants rated each item on a four-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). A higher average score for all items was related to higher self-esteem. The Cronbach's α coefficient of the scale was .86 in this study, thus indicating good internal consistency.

2.2.4. Sleep quality

The Chinese version of the Pittsburgh Sleep Quality Index was used (63). The scale consists of 18 self-rated items and measures seven components of sleep quality (e.g., "During the past month, how often have you taken medicine to help you sleep?"). Each item was scored on a four-point Likert scale from 0 (none) to 3 (at least three times a week). A higher average score for all items was related to worse sleep quality. The Cronbach's α coefficient of the scale was .91 in this study, thereby indicating excellent internal consistency.

2.2.5. Control variables

Control variables included region, average daily online time, and only-child status that may confound the relationship between CDAV and sleep quality. As previous study reported a difference in adolescent dating violence between urban and rural contexts (64). Average daily online time is a risk factor for cyber victimization in lifestyle-routine activities theory (65). The only-child status may also be a potential demographic variable that buffers the negative effect of adverse life events (66). We measured region and only-child status each with a simple question considering whether adolescents come from cities and towns or rural areas, and whether they have siblings. The average daily online time was measured with a question that how many hours do you spend on the internet every day.

2.3. Procedures

First, we contacted principals and teachers at public high schools to get permission to distribute questionnaires and collect data in their schools. Then, informed consent was obtained from the participating students. Before the questionnaires were distributed, the principles of voluntariness and confidentiality were emphasized, and students were informed that they could stop answering at any time if they experienced any discomfort. Questionnaires were distributed and collected during a regular class period under the supervision of a professional psychology researcher. The whole process lasted about 40 minutes. All procedures were in accordance with the ethics committee of the corresponding author's university.

2.4. The analytic plan

The SPSS 24.0 was used for data analyses. Pearson correlations were calculated to detect the relationship among all variables. Subsequently, the mediating roles of personal BJW, general BJW, and self-esteem were tested by the 5000 bootstrapping method in model 80 of PROCESS. This model posits that the link from CDAV to sleep quality would be mediated by PBJW, GBJW, and self-esteem separately, and there also would be an indirect path from CDAV to sleep quality via PBJW/GBJW and self-esteem sequentially (67).

3. Results

3.1. Descriptive statistics and correlation analysis

First, the prevalence of CDAV among Chinese female adolescents was analyzed. The results showed that almost half (49%) the participants had experienced CDAV in the past year. Correlation results showed that CDAV was negatively correlated with general BJW, personal BJW, and self-esteem, and positively correlated with poor sleep quality. general BJW was positively associated with personal BJW and self-esteem and negatively associated with poor sleep quality. personal BJW and self-esteem were positively correlated. Furthermore, poor sleep quality was significantly negatively correlated with personal BJW and self-esteem (Table 1).

Table 1 Means, Standard Deviations, and Correlation between the Main Variables

	M(SD)	1	2	3	4	5	6
1. Average online time	2.88(2.46)	1					
2. CDAV	.33(.50)	.15**	1				
3. General BJW	3.92(1.03)	.08	-.22***	1			
4. Personal BJW	4.09(.90)	-.05	-.31***	.72***	1		
5. Self-esteem	2.56(.50)	-.19***	-.19***	.23***	.34***	1	
6. Sleep quality	.78(.56)	.12*	.46***	-.42***	-.49***	-.53***	1

Note. CDAV = =Cyber dating abuse victimization, BJW = Belief in a just world; *p < .05, **p < .01, ***p < .001.

3.2. The mediation model tests

Model 80 of the PROCESS macro (67) was used to test all six hypotheses. The total effect of CDAV on poor sleep quality was significant (β = .46, p < .001), which supported Hypothesis 1. Additionally, as shown in Table 2 and Figure 1, CDAV significantly and negatively predicted general BJW (β = -.23, p < .001), personal BJW (β = -.31, p < .001), and self-esteem (β = -.09, p = .035). Personal BJW significantly and positively predicted self-esteem (β = .26, p < .001). Furthermore, general BJW (β = -.15, p = .008), personal BJW (β = -.16, p < .007), and self-esteem (β = -.38, p < .001) significantly and negatively predicted poor sleep quality. The direct effect of CDAV on poor sleep quality was still significant (β = .31, p < .001).

For the indirect effect, the total indirect effect was significant (coefficient = .15, Boot SE = .03, 95% Boot CI = [.09, .22]) and the ratio of indirect effect to total effect was 32.61%. Specifically, there were four significant indirect paths from CDAV to poor sleep quality: CDAV → general BJW → poor sleep quality (coefficient = .04, Boot SE = .02, 95% Boot CI = [.01, .07]); CDAV → personal BJW → poor sleep quality (coefficient = .05, Boot SE = .02, 95% Boot CI = [.01, .10]); CDAV → self-esteem → poor sleep quality (coefficient = .03, Boot SE = .02, 95% Boot CI = [.001, .07]); and CDAV → personal BJW → self-esteem → poor sleep quality (coefficient = .03, Boot SE = .01, 95% Boot CI = [.01, .05]). However, The serial indirect path of general BJW and self-esteem in the association of CDAV with sleep quality was non-significant (coefficient = -.001, Boot SE = .01, 95% Boot CI = [-.01, .01]). Thus, Hypotheses 2–5 were all supported, while Hypothesis 6 was not.

Table 2 The Mediation Model Test

Variables	General BJW		Personal BJW		Self-esteem		Poor sleep quality	
	β	t	β	t	β	t	β	t
Constant	.18	1.95	.30	3.30**	.34	3.79***	.02	.25
Region	-.05	-.49	-.04	-.38	.07	.77	-.07	-.92
AOT	.05	2.56*	-.01	-.19	-.07	-3.69***	.00	.18
Only-child status	-.59	-6.48***	-.54	-6.01***	-.34	-3.66***	.00	.03
CDAV	-.23	-5.12***	-.31	-6.83***	-.09	-1.94*	.31	8.07***
General BJW					-.01	-.11	-.15	-2.85**
Personal BJW					.26	3.83***	-.16	-2.99**
Self-esteem							-.38	-9.65***
R^2	.15		.17		.18		.48	
F	17.86***		20.97***		14.72***		55.09***	

Note. AOT = Average online time, CDAV = =Cyber dating abuse victimization, BJW = Belief in a just world; *p < .05, **p < .01, ***p < .001.
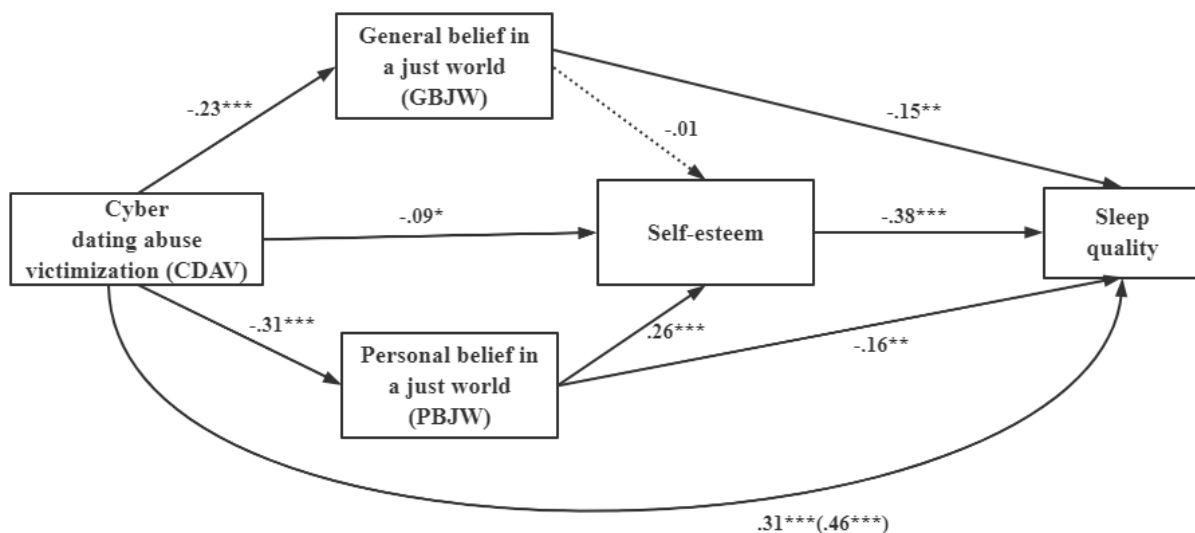

Figure 1: The mediation effects of general belief in a just world, personal belief in a just world and self-esteem in the relation between cyber dating abuse victimization and sleep quality.(Note. The parentheses represent the total effect of cyber dating abuse victimization on sleep quality. ***p < .001, **p < .01, *p < .05.)

4. Discussion

As far as we know, this study was the first to explore the link between CDAV and sleep quality in Chinese female adolescents, and whether BJW and self-esteem could explain this correlation. The results indicated that more experience of CDAV was significantly and positively correlated

with poorer sleep quality. CDAV affected female adolescents' sleep quality through the mediating roles of personal BJW, general BJW, and self-esteem separately. Surprisingly, only personal BJW and self-esteem sequentially mediated the link between CDAV and sleep quality, while general BJW could not predict self-esteem. That is, there was no indirect path from CDAV to sleep quality through general BJW and self-esteem sequentially.

First, our findings showed that female adolescents who experienced CDAV might have poor sleep quality such as sleep disturbance and use of sleep medication. This result was consistent with that of former research that established that experiences of peer victimization (25) and general cyber victimization (16) among adolescents could increase the risk of sleep problems. This correlation was also indicated among adult female victims of intimate violence who tended to have poorer sleep quality as those who had not been victimed (68). The result of our study was consistent with the theoretical model of stress and sleep quality relationship developed by Yan et al. (69), thus suggesting that a variety of stressful life events could directly decrease sleep quality. CDAV experiences cause a series of negative emotional reactions and behavioral problems among victims (10-12). Thus, CDAV can be viewed as a stressful life event to victims that may directly increase their sleep problems.

Second, our results demonstrated that personal BJW, general BJW, and self-esteem mediated the link between CDAV and sleep quality, respectively. The results were consistent with the findings of previous research, which demonstrated that cyber or traditional bullying victimization experiences shattered one's assumptions of personal BJW, general BJW, and self-esteem (35, 36, 39). Our finding also supported the SAT framework. Female adolescents with high BJW were inclined to think that they should "get what they deserve" (58). For instance, in a romantic relationship, individuals with high BJW believed they should be respected and trusted by their partners. However, experiencing cyber aggression or controlling behaviors may increase female adolescents' distrust and then challenge their BJW assumption. CDAV experiences may also lower one's self-evaluation, as they are likely to attribute adverse experiences to their fault, which can instill self-doubt and self-blame (58). Victimization experiences may challenge female adolescents' self-efficacy in handling intimate conflicts and further trigger their sense of inadequacy and unworthiness (70). Individuals with low BJW and low self-esteem are more likely to adopt negative coping strategies, including avoidance and rumination (71, 72), than are their counterparts. Many studies have suggested that using emotion-oriented negative coping styles to cope with stress has a negative effect on sleep quality (73, 74). When experiencing CDAV, female adolescents' BJW and self-esteem are at risk of being reduced and negative coping strategies interfere with their sleep quality and sleep efficiency (69).

Third, we merely found that self-esteem can be predicted by personal BJW rather than general BJW. There was an indirect path from CDAV to sleep quality through the sequential mediating roles of personal BJW and self-esteem, while not the sequential mediating roles of general BJW and self-esteem. Therefore, personal BJW was more essential in predicting self-esteem than general BJW. This finding was consistent with previous conclusions (55, 57). Personal BJW and general BJW are two distinct spheres: personal BJW is a more salient predictor in explaining individual prosperity than is general BJW (43). The reason may be that personal BJW concerns self-related processes and is related to self-reported measures (e.g., self-esteem; 75). However, general BJW reflects a basic belief that the world is a just place, which involves less self-assessment as compared to personal BJW (55). For this study, CDAV can decrease female adolescents' personal BJW, which may result in low self-esteem and subsequent sleep problems.

Fourth, the results of this study have several practical implications. For instance, CDAV was identified as an essential pressure source for female adolescents' poor sleep quality. There are also several cultural barriers, such as self-reliance and shame, which discourage Chinese females from seeking formal or informal help (76). Thus, parents, siblings, peers, and teachers

should give more attention to female adolescents when they start a romantic relationship, as opposed to leaving them alone to cope with traumatic events. Recent research has shown that an online intervention program is efficient to educate students about dating violence and appropriate bystander responses (77). Schools can adopt this intervention program to reduce CDAV. Furthermore, studies have indicated that students' BJW and self-esteem can be improved through some feasible strategies. For example, Hafer and Rubel (78) noted that "rational," "nonrational," and "protective" strategies are beneficial for the improvement of BJW. Physical activity interventions (79) and the establishment of positive self-images are also efficient strategies to improve self-esteem.

5. Limitations and future directions

This study had several limitations that should be addressed in future studies. First, despite the fact that it demonstrates promising mechanisms that may link CDAV and poor sleep quality among female adolescents, it is crucial to take a developmental perspective to view these associations. Adolescents are characterized as an oversensitive group to changeable external feedback that may be imperative to consider in our theoretical models of how this process unfolds over time. Further, Spector (80) noted that longitudinal designs based on several time points can lead to erroneous inference when the timeframe chosen does not match the timeframe of the phenomenon in question. Thus, future work may benefit from considering how CDAV predicts sleep quality based on intensive longitudinal data from daily-diary designs (80).

Another limitation is that we considered only global, trait-like, and explicit self-esteem. The results may differ if other indices are considered; for example, from a domain-specific view of self-esteem (81), which consists of multiple domains such as social, performance, and appearance self-esteem. Descartes et al. (82) found that the relationships between maladaptive behaviors and domain-specific self-esteem (i.e., social self-esteem, academic self-esteem) are stronger than those between maladaptive behaviors and global self-esteem. Moreover, utilizing a state self-esteem scale in several situations such as daily-diary or experience-sampling designs to capture trajectory change in self-esteem among adolescents may yield exciting results (81). Further, future research may consider evaluating whether explicit self-esteem and implicit self-esteem contribute differently to adolescents' development.

Additionally, given that self-esteem can be predicted by personal BJW but not general BJW, future research may benefit from distinguishing the different roles of these two spheres of BJW rather treating it as a whole (56) and whether they are differentially connected to other adjustment results among adolescence.

Furthermore, we suggest a concerted effort in identifying moderating variables that may accelerate or alleviate adverse consequences associated with CDAV and poor sleep quality. For instance, the CDAV experience to poor sleep quality link should be examined in diverse samples (e.g., adolescent males, adult females), which will increase our confidence to generalize findings across other populations. Regarding protective factors, the exploration of some external (e.g., social support) and internal resource factors (e.g., resilience) may be promising.

Finally, variable measurements also need improvement in the ensuing research step. For example, utilizing multiple measures such as polysomnography and actigraphy to obtain sleep quality data could be beneficial to improve construct validity. Moreover, self-report measurements increase the shared method variance and reporter effects, and the use of multi-source informants may be effective in measuring the real situation of participants. Overall, future research would benefit from including multiple methods across multiple levels of analysis, which would also deepen our understanding of the link between CDAV and poor sleep quality.

6. Conclusion

This explorative study revealed a link between CDAV and poor sleep quality among female adolescents through the mediating roles of BJW and self-esteem. Consistent with SAT and the cognitive–behavioral model of insomnia, we found that the stress of experiencing CDAV may hinder sleep quality. There were four indirect paths—namely, through personal BJW, general BJW, and self-esteem separately and through personal BJW and self-esteem serially. It may explain the association of CDAV with poor sleep quality. Nonetheless, this study employed a cross-sectional design to demonstrate these connections and preliminarily identified promising internal processes that may clarify the link between CDAV and poor sleep quality. We have also provided suggestions for further in-depth exploration.

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