Relationships of Short video use and insomnia symptoms among rural adults: A perspective on the mediating role of depression

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Abstract

Background: About four in ten people globally exhibit symptoms of insomnia. With the proliferation of short video apps in life, their impact on adult insomnia remains under explored.

Objective: The purpose of this study was to explore the relationship between short video use, insomnia symptoms, and the mediating role of depression among rural adults in China.

Methods: A cross-sectional survey was conducted from July to August 2023 in rural Shandong, China. A total of 2931 individuals were included in the analysis. Depression and insomnia symptoms were measured using the 10-item Center for Epidemiologic Studies Depression Scale (CESD-10) and the 8-item Athens Insomnia Scale (AIS-8), respectively. After match the short video users with the non-short video users by Propensity Score Matching method (PSM), the chi-square test and rank sum test were used to explore whether short video use was associated with depression and insomnia symptoms. The Ordinary Least Square method (OLS) was employed to determine this association further after controlling for the confounding factors. The significance of the mediation effect was obtained using a bootstrap approach with SPSS PROCESS macro.

Results: 42.17% (1236/2931) of the participants used the short video. A significant negative correlation was found between short video use and insomnia symptoms (?=-.590, P<.05). Depression fully mediated the association between short video use and insomnia symptoms (?=-.120, P>.1). The significance of the indirect accounted for 79.66% of the total variance in insomnia symptoms.

Conclusions: The present findings reveal that short videos use among adults can alleviate insomnia symptoms through its mediating effect on reducing depression. Thus, the potential benefits of short videos warrant further exploration and amplification, provided that addictive behaviors are avoided.

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Conclusions: The present findings reveal that short videos use among adults can alleviate insomnia symptoms through its mediating effect on reducing depression. Thus, the potential benefits of short videos warrant further exploration and amplification, provided that addictive behaviors are avoided.

Keywords: short video use; depression; insomnia symptoms; mediation effect; rural adults

Introduction

Background

Sleep, a vital biological process, is fundamental to maintaining overall health and regulating

individuals' physical, social, and mental well-being [1]. Epidemiological studies have demonstrated that poor sleep quality is significantly linked to the occurrence and development of various diseases, such as hypertension, dyslipidemia, type-2 diabetes, anxiety, and depression [2-5]. In 2022, the prevalence of insomnia rose alarmingly, affecting four in ten individuals globally [6].

Insomnia is associated with a range of risk factors like depression, female sex, older age, lower socioeconomic status, concurrent medical and mental disorders. It has been well documented in studies [7]. The condition is further exacerbated by perpetuating factors and stimulus control issues, as well as certain cognitive patterns [8]. Engaging in activities unrelated to sleep while in bed, for instance, can weaken sleep associations, leading to insomnia [9]. This is compounded by the presence of stimuli contrary to sleep promotion, like phone use, reading, gaming, or watching stimulating videos [10, 11]. Cognitive models suggest factors like excessive worry and negative thoughts may also contribute to insomnia symptoms [12, 13]. Notably, sleep disturbances, including insomnia, narcolepsy, and sleep-disordered breathing, are prevalent in about 90% of individuals suffering from depression [14-16].The popularity of short videos, typically lasting less than 15 minutes, has surged in recent years [17, 18]. Notably, TikTok was downloaded nearly 55 million times worldwide in November 2022. China accounted for the largest number of downloads with 12.3%, followed by Indonesia with 8.5%, and the United States with 8.2% [19]. Similar to online games and social media, short videos offer funny entertaining and personalized contents, which can be particularly addictive for younger audiences [20]. However, excessive use of such platforms is associated with various physical and mental health issues, including obesity, back and neck pain, visual and auditory problems, as well as depression and anxiety [21-23]. Research has highlighted that this addictive use, especially before bedtime, adversely affects sleep patterns in adolescents [11, 18, 24, 25]. However, the impact of such addictive use remains less explore among adults. Conversely, if used appropriately, short videos can serve beneficial purposes like providing health information, aiding in disease management, and enhancing social support for the elderly [26-28]. Therefore, having a clear understanding of the association and mechanism between short video use and insomnia symptoms in adults is very informative for the positive role of short video use.

Relationship between short video use and insomnia symptoms

Over the past two decades, new technologies and the Internet have irrefutably changed our lives, encompassing both the challenges of internet misuse and its significant benefits [29]. Social media usage has become widespread and integral part of daily life for many individuals [30].

Numerous studies focusing on adolescents have consistently linked evening social media usage to a variety of sleep issues. These issues range from delayed bedtimes [31] and increased difficulty falling asleep [32, 33], to shortened sleep duration [32, 34] and diminished sleep quality [35, 36]. Four mechanisms could elucidate the link between social media usage and sleep disturbances. First, the indefinite nature of social media can make it challenging for adolescents to disengage. This can directly replace sleep or other beneficial activities, like physical exercise, crucial for good sleep hygiene [11]. Second, engaging in online activities, like chatting and gaming before bedtime, can induce emotional, mental, or physical arousal, potentially leading to insomnia [37, 38]. Third, the blue light from electronic screens can inhibit melatonin production, a hormone essential for regulating sleep-wake cycles [39, 40]. This disruption can interfere with natural sleep-inducing mechanisms, making it more difficult to fall asleep. Lastly, social media can produce incoming messages with visual and auditory notifications. These notifications may interrupt sleep [36].

Conversely, some studies have identified positive effects associated with short video usage. For example, a 10-minute short video featuring positive stimuli could potentially enhance health outcomes [26, 41, 42]. Additionally, smartphone-based medical monitoring has also been utilized for

disease management [27]. Furthermore, the use of short video can enrich leisure time, mitigate social isolation, loneliness, and depression, and bolster social support for the elderly [28, 43]. However, the impact of short video usage on adult sleep patterns remains unclear.

The mediating role of depression

Mental health and sleep quality are intrinsically linked [44]. Depression leads to poor sleep quality, and conversely, poor sleep quality may trigger or exacerbate depression [45-47]. A study of German communities and students found that when both sleep quality and mental health are poor, efforts to improve mental health are more likely to promote improved sleep quality [48].

Short video is user-friendly and feature-rich, offering functionalities like commenting, chatting, following, liking, and live-streaming [17, 18, 49]. These features allow users of short video apps to connect and communicate with others, fulfilling their emotional needs. Short video app can be particularly beneficial for individuals with high levels of social anxiety, as it provides them a safe environment to interact with others and potentially alleviates social isolation and depression [50]. Moreover, humorous videos have the potential to elicit laughter among viewers. Laughter, often considered as a manifestation of joy and satisfaction, has the potential to alleviate feelings like anxiety, stress, loneliness, depression, thereby enhancing mood, optimism, energy levels, and cognitive function [51, 52]. Furthermore, short videos can offer virtual reality relaxation with immersive nature scenery and interactive animations. This approach shows promise as a mental health intervention. A cross-randomized controlled trial has shown that virtual reality relaxation effectively reduces negative emotional states in individuals with mental disorders, outperforming traditional relaxation techniques [53]. Therefore, the question arises: Does short video use mitigate insomnia symptoms by enhancing mental health, or does adult overuse exacerbate the problem? Further studies are necessary to address this issue.

The present study

Despite its late start, China's Internet development has seen exponential growth in the last two decades, making it the country with the highest number of Internet users globally [54]. Specifically, the Internet has significantly transformed the lives of the rural population, with user numbers steadily increasing [55]. By June 2023, there were 1079 million Internet users, with 301 million from rural areas, making up 27.9% of the total [56]. At the same time, the incidence of depression and insomnia symptoms is rising in rural areas. Over 20% of individuals experience poor sleep [57-60], and depression is detected in 16.5% of the population [61]. Recent years have seen an acceleration in urbanization, leading to an intensified aging process in China's rural regions due to the migration of the younger population to urban areas [62]. This migration is believed to have negative impact on their aging parents, including feelings of loneliness, isolation, depression, insomnia and a loss of support [63]. Due to the scarcity of psychological services, psychiatric issues like depression and insomnia often remain under-detected and under-treated [64, 65]. Fortunately, Internet usage among the rural populace can help narrow the health literacy and access to medical resources gap between urban and rural areas [66, 67], and enhance the self-efficacy of rural older adults [68]. Yet, the impact of short video usage on adult insomnia, particularly in regions like rural China where Internet adoption is burgeoning, remains largely unexplored.

Given this context, this study aims to examine the link between short video usage, depression, and insomnia symptoms among rural adults, and to assess if depression can medicate the association between short video usage and insomnia symptoms. Such a study could provide crucial insights for designing targeted strategies to prevent and intervene in insomnia among rural adults in the era of rapid information expansion.

Methods

Participants and procedures

This study's participants were drawn from a cross-sectional survey conducted between July and August 2023 in Shandong province. Located in Eastern China, Shandong province is the second-most populous province, characterized by uneven economic development among the eastern, middle, and western regions [69]. This regional disparity reflects the broader economic development patterns of China, making a comprehensive survey in Shandong a source of generalizable and representative data. A multilevel stratified sampling method was utilized in the survey. The survey was conducted through a series of steps. Initially, three cities facing significant poverty reduction challenges were selected based on the geographic distribution and administrative affiliation of 20 socioeconomically deprived counties in Shandong Province. Subsequently, two counties, identified as key areas for rural revitalization, were randomly chosen from each city. Finally, three townships per county and four villages per township were randomly selected. Approximately 35 households were randomly surveyed in each village.

All respondents were interviewed face-to-face by trained interviewers using a standardized questionnaire, after obtaining their informed consent and signing the questionnaire. The survey collected high-quality, representative data on various topics including demographic, socioeconomic status, sustainable livelihood capital, health, and healthcare utilization. To ensure the data quality, a comprehensive training program was implemented to clarify the questionnaire's content and establish standardized criteria for questioning prior to conducting the survey. Moreover, a coordinator in each sampled village monitored the investigation process, thoroughly reviewed the logic, completeness, and accuracy of each questionnaire. Questionnaires with incomplete information or logical errors were promptly recalled via telephone and rectified. Questionnaire data were double-entered using EpiData 3.1 and the database was cleaned using Stata 16.0.

After excluding samples with missing key information and those that did not meet the inclusion criteria, a total of 2527 valid household questionnaires were obtained from 72 administrative villages, resulting in a remarkable validity rate of 99.68%. After excluding samples with incomplete data on short video usage, depression, insomnia symptoms, or those under 18, 2931 valid samples were included. The nearest-neighbor matching was used to construct a 1:1 matching group. The covariates adjusted in Propensity Score Matching (PSM) included age, gender, education, smoking, overdrinking, liabilities, and disability. Following the PSM method, 2484 individuals were matched for the final analysis.

Measurement of insomnia symptoms

The 8-item Athens Insomnia Scale (AIS-8) was employed to evaluate symptoms of insomnia. The AIS was initially developed in English in 1992 by the senior author (C.R.S), who was the experts responsible for drafting the original diagnostic criteria for the sleep disorders section of The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) [70]. The AIS-8 is a self-assessment psychometric instrument designed for quantifying sleep difficulty. The scale provides a total score ranging from 0 (denoting absence of any sleep-related problem) to 24 (representing the most severe degree of insomnia) [71]. This scale has achieved satisfactory validity and reliability in China [71-75]. In this study, the Cronbach's Alpha was .926, the KMO statistic was 0.897, and the Bartlett sphericity test $P<.001$, as shown in Multimedia Appendix 1.

Measurement of short video use

In this study, short video use was defined as the explanatory variable, coded as 0 for “no” and 1 for “yes”. Short video use was investigated by a question: Have you ever used a short video app (e.g., TikTok, Kwai, WeChat Channels)? (Yes / No).

Measurement of depression

Depression was assessed using the 10-item Center for Epidemiologic Studies Depression Scale (CESD-10). The participants were asked to rate how they felt and behaved in the past week, answering a total of ten questions, two of which were positive and eight were negative [76]. The scale provides a total score ranging from 0 (denoting absence of any depression) to 30 (representing the most severe degree of depression) [76]. This scale has achieved satisfactory validity and reliability in China [77-79]. In this study, the Cronbach’s Alpha of the CESD was .897. Through KMO and spherical Bartlett test, KMO statistic was 0.921, and the spherical test P <.001, which indicated that factors analysis was appropriate, as shown in Multimedia Appendix 1.

Control variables

Control variables included age, gender, education level, per capita household income, marital status, cohabitation status, smoking habits, alcohol usage, financial liabilities, disability status, chronic disease presence, physical activity levels, and sedentary time (ST) [80-84]. We organized the control variables according to the following demographic characteristics: age (18-59 years=0, 60-95 years=1), gender (male=0, female=1), education (continuous variable), per capita household income (continuous variable), living with family (no=0, yes=1), smoking (no=0, yes=1), marital status (unmarried=0, married=1), chronic disease (no chronic disease=0, 1 chronic disease=1, multiple chronic diseases=2), overdrinking (no=0, yes=1), liabilities (no=0, yes=1), disability (no=0, yes=1), physical activity (low physical activity[LPA]=0, moderate physical activity[MPA]=1, vigorous physical activity[VPA]=2), sedentary time (<8h/day=0, ≥8h/day=1), depression (continuous variable), insomnia symptoms (continuous variable).

The per capita household income was logged. For marital status, “unmarried” included divorced, widowed, and never married options. The PA and ST were measured by International Physical Activity Questionnaire (IPAQ). IPAQ is a widely used questionnaire to assess PA levels. Its reliability and validity have been tested and proven to be good in previous studies [85]. In our research, we followed the data cleaning, truncation principles and PA level calculation methods used by Mengyu Fan scholars [86].

Statistical analysis

The descriptive analysis of the demographic characteristics was calculated. Means and Standard deviations (SDs) were used to describe the continuous variable, and frequencies and percentages were used to describe the discrete variable. Univariate analysis was used to test the association between short video use and health outcomes. The chi-square test was used for discrete variables and the rank-sum test for continuous variables that did not show normal distribution.

Given that short video use was not randomly distributed in the study, we used PSM to match the subjects. We used the Ordinary Least Square method (OLS) to explore the relationship between short video use, depression, and insomnia symptoms in individuals after PSM, using the following equation (1). Stata 14.0 was used for statistical analysis, P<.05 was considered statistically (2-sided).

$$Y_i=\beta X_i+\varepsilon_i \quad (i=1, \ldots, n)$$

(1)

Furthermore, the mediation analysis was performed using one independent variable (short video use), one dependent variable (insomnia symptoms), and one mediator (depression). It was analyzed using Model 4 in the PROCESS Marco in SPSS 24.0. For the best test of mediation effect, the bootstrapping procedure to measure indirect effect was carried out and 95% confidence intervals (CIs) were estimated. The number of bootstraps was 5000.

Results

Descriptive statistics

Table 1 displays the demographic composition of the 2931 participants, with 45.79% (1342/2931) males and 54.21% (1589/2931) females. The average age was 62.50 years, with a standard deviation (SD) of 13.70, ranging from 18 to 95 years. Participants had an average of 4.54 years of education. The majority of participants were married, cohabiting with family, non-smokers, abstained from excessive drinking, had no financial liabilities or disabilities, and reported less than 8 hours of ST per day. The mean score of CESD-10 was 10.74 (SD=4.44), and AIS-8 was 6.59 (SD=6.12). After analyzing data, we found the prevalence of depression was 52.92% (1551/2931) (CESD-10≥10), and insomnia symptoms were 41.49% (1216/2931) (AIS-8>6). More than half of the sample (1695/2931, 57.83%) consisted of short video nonusers, compared to 42.17% (1236/2931) who were users.

Table 1. Description and univariate analysis results (N=2931) [a]

Variables	Total (n=2931)	Non-short video users (n=1695)	Short video users (n=1236)	*P* value
Age, n (%)				<.001
18-59 years	1119 (38.18)	244 (14.40)	875 (70.79)	
60-95 years	1812 (61.82)	1451 (85.60)	361 (29.21)	
Gender, n (%)				.097
Male	1342 (45.79)	754 (44.48)	588 (47.57)	
Female	1589 (54.21)	941 (55.52)	648 (52.43)	
Education (years), mean (SD)	4.54 (4.04)	2.92 (3.44)	6.78 (3.71)	<.001
Per capita household income, mean (SD)	9.43 (0.73)	9.25 (0.68)	9.69 (0.72)	<.001
Marital status, n (%)				<.001
Married	2301 (78.51)	1187 (70.03)	1114 (90.13)	
Unmarried	630 (21.49)	508 (29.97)	122 (9.87)	
Living with family, n (%)				<.001
Yes	2226 (75.95)	1121 (66.14)	1105 (89.40)	
No	705 (24.05)	574 (33.86)	131 (10.60)	
Smoking, n (%)				.015
Yes	604 (20.61)	323 (19.06)	281 (22.73)	
No	2327 (79.39)	1372 (80.94)	955 (77.27)	
Overdrinking, n (%)				<.001
Yes	642 (21.90)	299 (17.64)	343 (27.75)	
No	2289 (78.10)	1396 (82.36)	893 (72.25)	
Liabilities, n (%)				<.001
Yes	658 (22.45)	332 (19.59)	326 (26.38)	
No	2273 (77.55)	1363 (80.41)	910 (73.62)	

Disability, n (%)				<.001
Yes	198 (6.76)	153 (9.03)	45 (3.64)	
No	2733 (93.24)	1542 (90.97)	1191 (96.36)	
Chronic disease, n (%)				<.001
No chronic disease	1326 (45.24)	551 (32.51)	775 (62.70)	
1 chronic disease	855 (29.17)	556 (32.80)	299 (24.19)	
Multiple chronic diseases	750 (25.59)	588 (34.69)	162 (13.11)	
Physical activity, n (%) [b]				<.001
LPA	861 (29.38)	570 (33.63)	291 (23.54)	
MPA	1001 (34.15)	603 (35.58)	398 (32.20)	
VPA	1069 (36.47)	522 (30.80)	547 (44.26)	
Sedentary time, n (%)				<.001
<8h/day	2450 (83.59)	1373 (81.00)	1077 (87.14)	
≥8h/day	481 (16.41)	322 (19.00)	159 (12.86)	
Depression, mean (SD)	10.74 (4.44)	11.53 (4.67)	9.65 (3.84)	<.001
Insomnia symptoms, mean (SD)	6.59 (6.12)	7.61 (6.42)	5.20 (5.39)	<.001

[a] continuous variables report means (SDs); discrete variables report frequency (percentage);
[b] LPA: Low physical activity; MPA: Moderate physical activity; VPA: Vigorous physical activity

Figure 1 illustrates that, following PSM, the percentage bias for all control variables was under 10%. Additionally, the balance test results showed that the P-values of t-tests for all control variables were greater than .05, which implied that the balance test was passed [87-89], as shown in Multimedia Appendix 2.

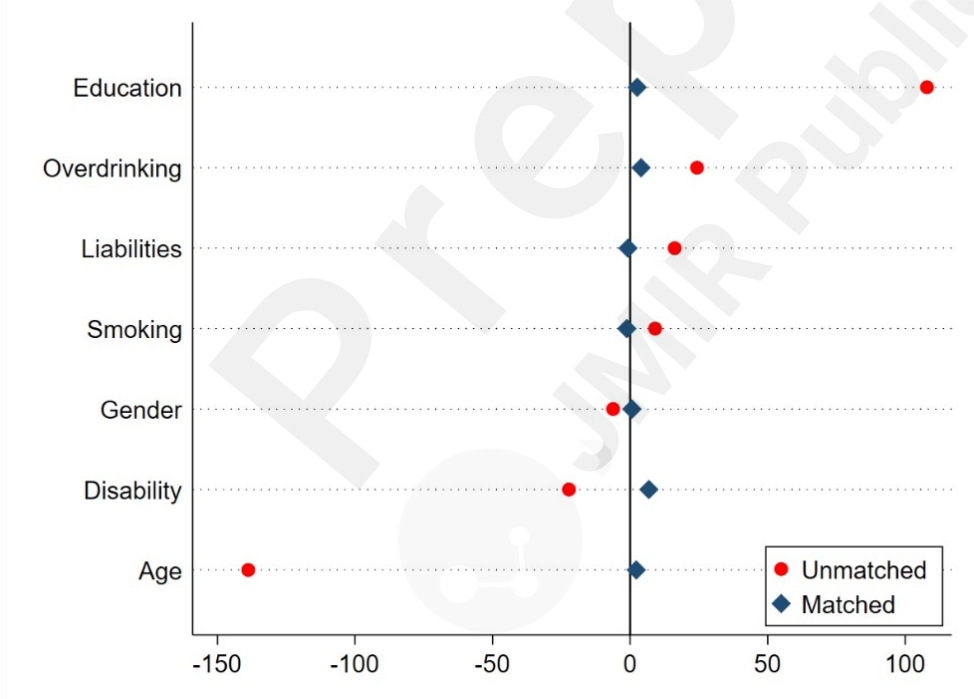

Figure 1. Standardized bias plot

OLS regression results of short video use, depression and insomnia symptoms

Table 2 summarizes the results of OLS regression analysis and shows the relationship between short video usage and symptoms of depression and insomnia, while incorporating a range of control variables. The analysis revealed that short video usage was inversely associated with both depression (β=-.466, *P*<.05) and insomnia symptoms (β=-.684, *P*<.05), suggesting that increased time spent on

short videos may exert a protective effect against these conditions.

In Table 2, depression showed has a significant positive correlation with the presence of chronic disease (at the 1% significance level). Conversely, depression is negatively associated with per capita household income, marital status, overdrinking, PA (all at the 1% significance level), and education, living with family (both at the 5% significance level). Meanwhile, insomnia has a positive association with gender, liabilities, chronic disease at the 1% significance level, and disability, ST at the 5% significance level. And insomnia showed negative correlation with education and PA at the 1% significance level.

Table 2. Regression analysis among study participants (N=2484) [a]

Variables	Depression				Insomnia symptoms			
	β	SE	*P* value	95% CI	β	SE	*P* value	95% CI
Short video use								
Yes (ref: No)	-.466	0.211	.027	(-0.880, -0.052)	-.684	0.288	.018	(-1.248, -0.120)
Age								
60-95 (ref: 18-59)	-.136	0.220	.538	(-0.568, 0.296)	.320	0.307	.297	(-0.281, 0.922)
Gender								
Female (ref: Male)	.254	0.230	.078	(-0.197, 0.704)	.838	0.323	.009	(0.205, 1.471)
Education	-.068	0.028	.013	(-0.122, -0.014)	-.132	0.038	<.001	(-0.206, -0.058)
Per capita household income	-.396	0.120	.001	(-0.632, -0.160)				
Marital status								
Married (ref: Unmarried)	-.812	0.256	.002	(-1.313, -0.310)				
Living with family								
Yes (ref: No)	-.494	0.247	.045	(-0.977, -0.010)	-.024	0.285	.934	(-0.582, 0.535)
Smoking								
Yes (ref: No)	-.186	0.271	.491	(-0.717, 0.344)	-.156	0.374	.678	(-0.890, 0.579)
Overdrinking								
Yes (ref: No)	-1.050	0.266	<.001	(-1.571, -0.529)	-.698	0.368	.058	(-1.420, -0.025)
Liabilities								
Yes (ref: No)					1.830	0.299	<.001	(1.243, 2.417)
Disability								
Yes (ref: No)					1.324	0.649	.041	(-0.052, 2.597)
Chronic disease								
1 chronic disease (ref: No chronic disease)	1.084	0.205	<.001	(0.682, 1.486)	1.720	0.284	<.001	(1.163, 2.278)
Multiple chronic diseases (ref: No chronic disease)	1.841	0.222	<.001	(1.407, 2.276)	3.059	0.306	<.001	(2.459, 3.660)
Physical activity [b]								
MPA (ref: LPA)	-1.377	0.213	<.001	(-1.794, -0.960)	-1.309	0.296	<.001	(-1.890, -0.728)
VPA (ref: LPA)	-1.389	0.216	<.001	(-1.813, -0.965)	-1.531	0.301	<.001	(-2.121, -0.941)
Sedentary time								
≥8h/day (ref:<8h/day)	.007	0.233	.975	(-0.450, 0.465)	.787	0.323	.015	(0.155, 1.420)

[a] β: coefficient, SE: standard error, CI: confidence internal;

[b] LPA: Low physical activity; MPA: Moderate physical activity; VPA: Vigorous physical activity

Testing the mediating role of depression

Following the regression analysis results, we performed mediation analysis to further explore the association between short video usage, depression, and insomnia symptoms among rural adults in China. The significance of the indirect and total effects in the mediation model was identified after controlling for sociodemographic variables (education, PA, and chronic disease). There was a significant negative correlation between short video usage and depression (β=-.621, P<.001), as well as between short video usage and insomnia symptoms (β=-.590, P<.05). In the mediation model that incorporated both short video usage and depression, depression showed a significant positive relationship with insomnia symptoms (β=.758, P<.001), whereas the direct link between short video usage and insomnia symptoms was not significant (β=-.120, P>.1). Thus, the results indicated that the mediating role of depression holds and is fully mediated, shown in Figure.2. Moreover, the results of the non-parametric bootstrapping method confirmed that the indirect effect of short video use through depression, with a 95% CI ranging from -0.748 to -0.193. The bootstrapped 95% CI highlighted an indirect effect of -0.470 by short video usage on insomnia symptoms, mediated by depression. The indirect effects of depression accounted for 79.66% of the total variance in insomnia symptoms, shown in Table 3. These findings corroborate our hypothesis that depression may play a mediator role in the association between short video usage and insomnia symptoms. Figure.2 depicts the mediation model, complete with path coefficients.

Table 3. Mediating model examination by bootstrap

	Coefficient	LLCI	ULCI	Efficiency ratio
Total effect	-0.590	-1.091	-0.090	
Direct effect	-0.120	-0.550	0.310	20.34%
Indirect effect	-0.470	-0.748	-0.193	79.66%

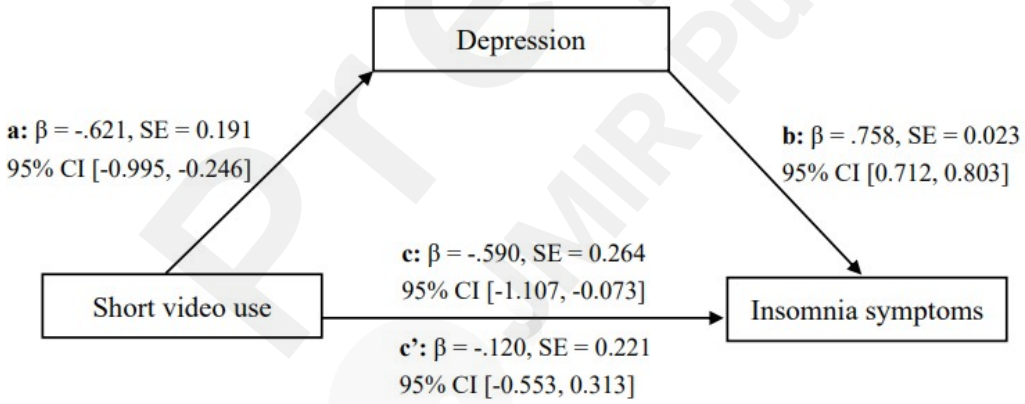

Figure 2. Proposed models that investigate mediated effects

Discussion

Principal Findings

Sleep is fundamental to optimal physical and mental health [90]. In this study, we investigated the link between short video use and insomnia symptoms among China's rural adults, with a specific interest in depression's mediating role in this dynamic. We discovered that short video usage decreased insomnia symptoms by attenuating the mediating effect of depression, which accounted for 79.66% of the relationship. However, in high-income countries like the United States, United Kingdom, and Japan, studies have confirmed a correlation between general screen time and sleep

disturbances among adults [91]. In addition, school-aged children and adolescents may also encounter sleep problems due to addiction to games and insufficient sleep time [11, 32, 92], presenting a discrepancy with our findings.

Our study found several potential reasons for short video usage reducing insomnia symptoms. Firstly, the engaging content and format of short videos likely provide viewers with enjoyment. Users sharing memorable moments on social media can help enhance happiness, alleviate depression, and lessen insomnia symptoms [18, 93]. Secondly, compared to those who living in urban area, rural population tends to have fewer opportunities for social interaction [94]. Short video usage can foster social connection, potentially reducing depression and insomnia symptoms. Seung Hee Lee et al. found that Internet could serve as a tool to surmount social and spatial obstacles, facilitating connections with family, friends, and the broader world, thereby lowering depression risks [95-97]. Kritina G Challands et al. showed that online social participation can alleviate negative consequences of mental health brought by reduced social connection due to limited mobility [98, 99]. Undoubtedly, Short video, as part of the Internet, can also alleviate depressive effectively [100]. Lastly, the scarcity of medical resources in rural locales positions short video usage as a viable form of cognitive therapy, effectively alleviating insomnia symptoms [101-104]. Cognitive behavioral therapy is considered the gold standard treatment for insomnia, and the Internet has proven to be a useful and successful tool to providing therapy and health information [103, 105]. Therefore, short video use can be effective in improving sleep quality in rural adults.

However, it's noteworthy that one study revealed that while initial increases in Internet use duration correlate negatively with depression scores, this trend reverses with prolonged usage [93]. Therefore, it's advisable for users to control the length of the time they spend on short videos use. Indeed, our research data also suggested that adults generally exhibit restraint and self-control in their usage patterns. Only 25.65% of adults using it for more than two hours a day. Therefore, using short video in moderation may be a useful option for reducing depression and improving insomnia symptoms in rural population.

Additionally, our findings indicated that factors like higher educational levels, appropriate physical activity and reducing sedentary time serve as protective factors against symptoms of insomnia and depression. This aligns with the results of prior researches [106-108]. Furthermore, individuals with lower levels of education were more likely to face constrained economic and social resources, heightening their susceptibility to stressful life events that can precipitate insomnia [109, 110].

Limitations

There are several limitations in the present study. Firstly, this is a cross-sectional observational design precludes the performance of any interventions. It is difficult to identify causal effect between short video use and insomnia symptoms. Secondly, due to the large number of missing values removed for the main variables "short video use" "depression" "insomnia symptoms", the representativeness may be limited due to the reduction of the sample size for analysis. Thirdly, the reliance on self-reporting measures to assess depression and insomnia symptoms introduces potential self-report and recall biases, impacting result accuracy. For future research, employing both self-assessment tools and clinical diagnostic evaluations is recommended for a more comprehensive mental health assessment. Furthermore, implementing a longitudinal design to investigate causal relationships more effectively.

Conclusions

This study examined the interactive mechanisms underlying short video usage and insomnia

symptoms among rural Chinese adults, specifically focusing on depression's mediating role. The prevalence of insomnia symptoms identified in our cohort was as high as 41.49%. These findings highlight the critical need to address insomnia, suggesting that controlled short video usage coupled with mental health improvements could effectively alleviate reduce insomnia symptoms. While Internet technology increasingly supports healthcare, rural populations remain less familiar with its use due to educational and accessibility limitations [82, 111]. Our study found a modest short video usage rate of 42.17% among rural adults. This research highlighted the importance of addressing these barriers and introducing appropriate interventions to improve access to online resources and support for healthcare in rural population.

Firstly, considering the accessibility of short video among rural population, it may be beneficial to utilize this platform as a medium for cognitive therapy and to pilot interventions targeting insomnia symptoms in rural areas of China. Secondly, the government can utilize big data platforms to disseminate video content, such as health education and popularization of health sciences, to rural populace. This can help promote healthy behaviors and improve overall well-being among rural communities. Thirdly, short video needs to be gradually designed with user-friendly features tailored to rural users, thereby improving their overall experience. To promote responsible usage among rural population, platforms should implement timeout or late-night rest reminders. By promoting responsible use, adverse effects such as insomnia symptoms can be mitigated to ensure that rural population benefits from the use of short video.

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Authors' Contributions

Conception or design of the work: JL; Data collection: JL, JH, SD, SZ; Data analysis and interpretation: JH, SZ; Drafting the article: JH; Critical revision of the article: JL, SD, ZY. Final approval of the version to be submitted: All authors.

Conflicts of Interest

None declared.

Abbreviations

APP: application
CESD-10: 10-item Center for Epidemiologic Studies Depression Scale
AIS-8: 8-item Athens Insomnia Scale
PSM: Propensity Score Matching method
OLS: Ordinary Least Square method
ST: sedentary time
LPA: low physical activity
MPA: moderate physical activity
VPA: vigorous physical activity
IPAQ: International Physical Activity Questionnaire
SDs: Standard deviations
CIs: confidence intervals

ICD-10: International Statistical Classification of Diseases and Related Health Problems 10th Revision

Data Availability

Data will be made available on request.

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Supplementary Files

Multimedia Appendixes

Scale reliability and validity tests.
URL: http://asset.jmir.pub/assets/64fc1e58e6c781e76b7858eefe0b840f.docx

Results of balance test.
URL: http://asset.jmir.pub/assets/e5adf26b4d6132711d3afb24d9c4ee05.docx