FAMILY AND COMMUNITY ENVIRONMENTAL FACTORS AND SLEEP IN CHINESE ADOLESCENTS

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DISCLOSURE

➢ All authors in this study do not have a conflict of interest.

BACKGROUND

➢Sleep problems are prevalent in adolescents worldwide.

➢Both quality (e.g., insomnia) and quantity (e.g., short sleep duration) in sleep have been critical public health issues in adolescents.

➢The prevalence of insomnia in adolescents varies in studies ranging from 7%-37%.

➢Literature review suggested that adolescents had insufficient sleep.

➢However, the impact of family and community social environments on sleep has not been consistently addressed for adolescents.

OBJECTIVE

➢ The current study examined the associations between family and community social environmental factors and sleep problems in adolescents.

SECONDARY DATA

➢ The data used in the current study derived from the baseline survey of the Shandong Adolescent Behavior and Health Cohort (SABHC).

➢ The project was approved by the research ethics committee of Shandong University School of Public Health.

➢ Informed consents were obtained from participants and permissions were obtained from their parents before the survey.

➢ The survey was conducted in five public middle schools and three public high schools in 3 counties of Shandong Province of China in 2015.

➢ Data of 11,831 students were used for secondary data analysis.

PARTICIPANTS

➢ Participants were sampled from 7th-11th graders in the eight target schools.

➢ All sampled students who attended school on the day of the survey were invited to participate in the study during regular school hours.

➢ A self-administered, structured adolescent health questionnaire (AHQ) was used.

➢ Participants were informed that the survey was anonymous and their participation was voluntary and they can withdraw at any time or skipped any questions if they wanted.

➢ Trained public health staff who were from the local medical offices with Master-degree education administered AHQ to participants in students' classrooms.

➢ **Perceived family environment (PFE) (4 items)**

- ❖ Parents' education

- ❖ Perceived parents' health status

- ❖ Parents' marital relationship

- ❖ Family economic status

- ❖ Cronbach's $\alpha = 0.69$

➢ Perceived community social environment (PCE) (4 items)

  ❖ Community safety

  ❖ Community economic situation

  ❖ Community hygiene

  ❖ The relationship with neighbor communities

  ❖ Cronbach's $\alpha = 0.73$

MEASURES - OUTCOMES

➢ **Sleep duration:**

  ❖ Adolescents were asked how many hours they slept at night on average in the past month

  ❖ Short sleep duration was divided by the mean of the variable in this sample (< 7 hours vs. ≥ 7 hours)

➢ **Insomnia symptoms - Youth Self-Rating Insomnia Scale (YSIS):**

  ❖ 8 items with 5-point response (difficulty initiating sleep, difficulty maintaining sleep, early morning awakening, unrefreshing sleep, poor sleep quality, sleep insufficiency, sleep dissatisfaction, and interference of sleep difficulties with daytime functioning)

  ❖ For example, "During the past month, how would you rate the quality of your sleep overall?"
     (1 = very good to 5 = very poor)

  ❖ A composite score of summing up the 8 items (ranged 8-40, the Cronbach's alpha = 0.80)

  ❖ A higher total score of the YSIS indicates a greater insomnia severity during the past month

  ❖ A moderate/severe insomnia that may be more clinically relevant (YSIS score < 26 vs. YSIS score ≥ 26)

MEASURES - COVARIATES

- **Adolescents individual demographics:**

  - ❖ Age and gender

- **Mental health:**

  - ❖ Anxious/depressive symptoms were measured

  - ❖ Using the anxious/depressed subscale in the Youth Self-Report of the Child Behavior Checklist

  - ❖ (16 items, 3-point response, the Cronbach's alpha = 0.88)

- **Health related risk behaviors and chronic conditions:**

  - ❖ Ever cigarette smoking (no or yes), ever alcohol drinking (no or yes)

  - ❖ Chronic conditions (no or yes)

STATISTICAL ANALYSIS

- The descriptive statistics were calculated

- Chi-square test for categorical variables

- Independent sample t-test for continuous/ordinal variables

- ANOVA (Post-Hoc Tests) for continuous/ordinal variables

- Multiple logistic regression analysis

- SPSS version 28 was used for all statistical analyses

➢ Mean age of the sample was about 15 years old (SD=1.46)

➢ 50.9% were male

➢ Mean sleep duration was 7 hours (SD=1.43)

➢ Table 1. Description of sleep duration

	Five categories of sleep duration, n (%)				
	≤ 5 hours	6 hours	7 hours	8 hours	≥ 9 hours
N= 11,831	1,797 (15.6)	3,866 (33.6)	2,702 (23.5)	1,795 (15.6)	1,357 (11.8)

➢ The prevalence of insomnia was 17.1%

Table 2. Bivariate analysis of sleep duration

	Total	Sleep duration§
	N (%)	M±SD (Post-Hoc Tests)
Total	11,831	7.10±1.43
PFE, M±SD	15.33±3.09	
(1) < 25th percentile	2,095 (18.9)	7.03±1.41*** (1-4; 2-4; 3-4)
(2) 25th-49th percentile	3,671 (33.2)	7.10±1.38
(3) 50th-75th percentile	2,504 (22.6)	7.07±1.43
(4) >75th percentile	2,796 (25.3)	7.23±1.52
PCE, M±SD	12.23±1.96	
(1) < 25th percentile	1,686 (15.3)	7.05±1.42* (2-4)
(2) 25th-49th percentile	4,170 (37.7)	7.05±1.40
(3) 50th-75th percentile	2,988 (27.0)	7.12±1.44
(4) >75th percentile	2,208 (20.0)	7.16±1.47

Note: *p<0.05, ***p<0.001. §ANOVA (Post Hoc Tests).
PFE=Perceived family environment.
PCE= Perceived community social environment.

Table 3. Bivariate analysis of insomnia symptoms

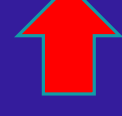|	YSIS score§	
	N/M±SD	M±SD (Post-Hoc Tests)
Total	11,831	19.13±6.20
PFE, M±SD	15.33±3.09	
(1) < 25th percentile	2,095	20.95±6.07*** (1-2; 1-3; 1-4; 2-3; 2-4; 3-4)
(2) 25th-49th percentile	3,671	19.54±5.99
(3) 50th-75th percentile	2,504	18.49±6.02
(4) >75th percentile	2,796	17.54±6.20
PCE, M±SD	12.23±1.96	
(1) < 25th percentile	1,686	21.29±6.37*** (1-2; 1-3; 1-4; 2-3; 2-4; 3-4)
(2) 25th-49th percentile	4,170	19.65±5.88
(3) 50th-75th percentile	2,988	18.36±5.98
(4) >75th percentile	2,208	17.49±6.19

Note: ***p<0.001. §ANOVA (Post-Hoc Tests). YSIS=Youth Self-Rating Insomnia Scale.
YSIS score ≥ 26: Moderate/severe insomnia (The cutoff is based on ROC curve analysis, Liu et al. 2019)
PFE=Perceived family environment. PCE=Perceived community social environment.

LOGISTIC REGRESSION MODELS

- Model 1 - dependent variable:

  - short sleep duration (< 7 hours vs. ≥ 7 hours)

- Model 2 - dependent variable:

  - moderate/severe insomnia (YSIS score ≥ 26 vs. YSIS score < 26)

- A poor PFE ⬆ short sleep duration (aOR=1.2, p<.05)

- A poor PFE ⬆ moderate/severe insomnia (aOR=1.4, p<.001)

- A poor PCE ⬆ moderate/severe insomnia (aOR=1.7, p<.001)

- A poor PCE ➡ short sleep duration (p>.05)

DISCUSSION

➤ **The main findings**

❖ Adolescents who were older, female, smokers, alcohol users, and who had anxiety/depression were more likely to have short sleep duration and suffer from insomnia.

❖ Poor family environment and poor community social environment were independently associated with short sleep duration and insomnia in adolescents.

❖ Low Cronbach's alpha of PFE is a limitation.

PUBLIC HEALTH IMPLICATION

➢ Public health or behavioral interventions focusing on improving family and community social environments need to be considered in future sleep related interventions, especially for older female adolescents.

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