Preplanned Studies

Sleep Patterns of Chinese Aged 15 and Above with Different Characteristics — China, 2024

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Summary

What is already known about this topic?

Comprehensive data characterizing sleep patterns across China's diverse population remain scarce.

What is added by this report?

Among Chinese residents aged 15 years and older, this study found a mean sleep duration of 7.24 [95% confidence interval (*CI*): 7.16, 7.32] hours, a mean sleep latency of 27.45 (26.39, 28.51) minutes, a mean bedtime of 22:08 (21:58, 22:18), and a mean wake-up time of 6:18 (6:06, 6:30). Sleep patterns varied considerably across age groups and other demographic characteristics.

What are the implications for public health practice?

Rather than adopting uniform guidelines, public health interventions should implement tailored, context-specific sleep strategies that effectively address the distinct needs of diverse population groups.

ABSTRACT

Introduction: Sleep is fundamental to health, yet comprehensive data characterizing sleep patterns across China's diverse population remain scarce. This national study systematically assessed sleep behaviors among Chinese residents aged 15 years and above.

Methods: A population-based cross-sectional survey was conducted in 2024 among individuals aged 15 years and older, using multistage stratified cluster random sampling. Trained investigators collected data on sleep duration, sleep latency, bedtime, and wake-up time through standardized questionnaires. Statistical analyses incorporated sampling weights to ensure population representativeness, and stratified analyses examined sleep patterns across a range of demographic subgroups.

Results: The population-weighted mean sleep duration among Chinese residents aged 15 years and older was 7.24 [95% confidence interval (*CI*): 7.16, 7.32] hours in 2024. Mean bedtime and wake-up time were 22:08 (21:58, 22:18) and 6:18 (6:06, 6:30), respectively, with a mean sleep latency of 27.45 (26.39, 28.51) minutes. Age-stratified analyses revealed notable sex differences in sleep duration: among adults aged 18–44 years, females slept longer than males [7.66 (7.59, 7.73) hours versus 7.49 (7.41, 7.57) hours], whereas among those aged 45–64 years, females slept less [6.82 (6.72, 6.92) hours versus 6.97 (6.90, 7.04) hours]. Rural adolescents slept longer than their urban counterparts [8.39 (8.14, 8.64) hours versus 8.00 (7.78, 8.22) hours]. Both education level and occupation further influenced sleep duration and timing.

Conclusion: Sleep patterns among Chinese residents vary substantially by age, sex, and socio-environmental context. Effective sleep health strategies must be population-specific and tailored, rather than relying on uniform recommendations. Public health interventions should explicitly address the distinct socioeconomic and environmental determinants that shape sleep in different population segments, thereby optimizing sleep outcomes across diverse settings.

Sleep represents a fundamental pillar of health and well-being, yet population-level sleep characteristics remain incompletely understood, particularly in large and diverse populations such as China (*1*). Prior research has predominantly examined isolated metrics — either sleep duration or sleep quality — while the complex interrelationships among multiple sleep parameters, including timing and latency, remain poorly characterized (*2*). This knowledge gap impedes the development of effective, evidence-based sleep health interventions. To address this gap, this study conducted a nationally representative survey comprehensively assessing sleep patterns among Chinese residents aged 15 years and above, with particular attention to variation across demographic subgroups defined by sex, urban or rural residence,

educational attainment, and occupation. The findings offer a foundation for developing tailored, evidence-based strategies for sleep health promotion that account for the multidimensional nature of sleep behavior across diverse population contexts.

This survey employed a multistage stratified cluster sampling design to recruit a sample representative of China's general adult population, excluding military personnel and institutionalized individuals. Eligibility required at least one month of continuous residence at the current address; individuals residing in student dormitories, military barracks, correctional facilities, or hospitals were ineligible. The sampling procedure comprised five stages. First, one provincial-level administrative division (PLAD) was randomly selected from each of China's seven major geographical regions (North China: Hebei; Northeast China: Liaoning; East China: Jiangsu; Central China: Henan; South China: Guangdong; Southwest China: Chongqing; Northwest China: Shaanxi). Second, probability proportional to size (PPS) sampling was used to select 10 county-level administrative divisions within each PLAD, which served as primary sampling units (PSUs). Third, three districts (urban areas) or townships (rural areas) were selected from each PSU using PPS. Fourth, two communities or villages were selected from each district or township. Fifth, simple random sampling was used to recruit 120 households from each district or township, and one individual aged 15 years or older was then randomly selected from each household. Data collection took place from June to November 2024. All participants provided informed consent electronically prior to participation. The institutional review board of the Chinese Center for Disease Control and Prevention approved the study protocol (approval number 202410).

In this study, "sleep patterns" refers to the multidimensional behavioral characteristics of an individual's daily sleep–wake cycle. These patterns were quantified through standardized questionnaires capturing four self-reported macroscopic metrics. Sleep duration was assessed using the question "During the past month, how many hours of actual sleep did you get at night?", representing average nightly nocturnal sleep — excluding naps — over the preceding month. Bedtime was ascertained from responses to "When have you usually gone to bed?" and wake-up time from "When have you usually gotten up in the morning?" Sleep latency was derived from "How long (in minutes) has it taken you to fall asleep each night?"

To account for the complex multistage stratified sampling design, a comprehensive weighting strategy was implemented to ensure that results were representative of the community-dwelling population aged 15 years and above across the study regions. The final sampling weights were constructed as the product of three components: 1) base weight, derived from the inverse of the selection probabilities at each sampling stage; 2) non-response adjustment weight, calculated to compensate for individual-level non-participation; and 3) post-stratification weight, calibrated to the age, sex, and urban–rural distribution of the national population according to the 2020 Census. All statistical analyses incorporated these final weights to strengthen the population-level validity of the estimates. Normally distributed continuous variables were presented as means with 95% confidence intervals (*CI*s). Group comparisons were performed using t-tests or one-way analysis of variance (ANOVA) for normally distributed data. All analyses were conducted in SAS software (version 9.4, SAS Institute Inc., Cary, NC, USA) and R version 4.4.1. Statistical significance was defined as a two-tailed $P<0.05$.

In 2024, the weighted mean sleep duration among Chinese residents aged 15 years and above was 7.24 (95% *CI*: 7.16, 7.32) hours. The mean bedtime was 22:08 (21:58, 22:18), the mean wake-up time was 6:18 (6:06, 6:30), and the mean sleep latency was 27.45 (26.39, 28.51) minutes. Compared with males, females had significantly shorter sleep duration [7.21 (7.11, 7.31) hours versus 7.26 (7.19, 7.33) hours, $P=0.03$], earlier bedtimes [22:00 (21:51, 22:09) versus 22:16 (22:04, 22:28), $P<0.0001$], earlier wake-up times [6:12 (6:01, 6:23) versus 6:24 (6:12, 6:36), $P<0.0001$], and longer sleep latency [29.89 (28.53, 31.25) minutes versus 25.08 (24:13, 26:03) minutes, $P<0.0001$]. A clear age-related gradient was evident: compared with younger adults, older adults experienced progressively shorter sleep duration [from 8.21 (8.02, 8.40) hours to 6.79 (6.70, 6.88) hours], earlier sleep schedules [bedtime: from 22:41 (22:31, 22:51) to 21:10 (21:04, 21:16); wake-up time: from 7:48 (7:25, 8:11) to 5:10 (5:05, 5:15)], and longer sleep latency [from 25.33 (20.82, 29.84) minutes to 34.78 (32.95, 36.61) minutes]. Urban residents maintained later bedtimes [22:32 (22:19, 22:45) versus 21:49 (21:43, 21:55), $P<0.0001$] and wake-up times [6:39 (6:23, 6:55) versus 6:01 (5:54, 6:08), $P<0.0001$] than their rural counterparts, while also exhibiting shorter sleep latency [25.91 (24.62, 27.20) minutes versus 28.76 (27.54, 29.98) minutes, $P<0.0001$]. Geographically, residents of East China [7.11 (6.97, 7.25) hours] and North

China [7.11 (6.99, 7.23) hours] reported the shortest sleep durations, whereas those in South China reported the lowest sleep latency [25.50 (23.00, 28.00) minutes] and the latest sleep schedules [bedtime: 23:01 (22:53, 23:09); wake-up time: 7:05 (6:52, 7:18)]. Higher educational attainment was associated with later sleep schedules and notably shorter sleep latency. Certain occupations — particularly government or public institution staff and retirees — were associated with shorter sleep duration, while agricultural workers, retirees, and unemployed individuals tended toward earlier sleep schedules and longer sleep latency. Furthermore, current alcohol drinkers and ever-smokers experienced shorter sleep duration and earlier wake-up times compared with their respective counterparts (Table 1).

Age-stratified analyses revealed distinct sex-based patterns across different life stages. Among adolescents aged 15–17 years, no significant sex differences were observed in sleep duration, sleep latency, bedtime, or wake-up time. In the 18–64 age group, females consistently demonstrated longer sleep latency and earlier sleep schedules than males. Sleep duration patterns, however, diverged by age subgroup: females aged 18–44 years slept significantly longer than males [7.66 (7.59, 7.73) hours versus 7.49 (7.41, 7.57) hours], whereas females aged 45–64 years slept significantly less than their male counterparts [6.82 (6.72, 6.92) hours versus 6.97 (6.90, 7.04) hours]. Urban–rural comparisons revealed that rural adolescents aged 15–17 years slept substantially longer than urban peers [8.39 (8.14, 8.64) hours versus 8.00 (7.78, 8.22) hours], though this difference was not apparent in older age groups. Among individuals aged 18 years and above, urban residents consistently maintained later sleep schedules than rural residents. Educational attainment correlated positively with sleep duration in the 18–64 age group, and higher education levels were associated with progressively later sleep schedules across all adult age groups (18+ years). Occupational patterns showed notable variation: among those aged 18–44 years, students achieved the longest sleep duration [8.40 (8.28, 8.52) hours], while retirees [6.69 (6.54, 6.84) hours] and government or public institution staff [7.07 (6.85, 7.29) hours] reported the shortest. Agricultural workers consistently exhibited the earliest sleep schedules [bedtime: 21:50 (21:41, 21:59); wake-up time: 6:12 (6:04, 6:20)]. Among those aged 65 years and above, teachers demonstrated both the longest sleep duration [7.52 (7.01, 8.03) hours] and the shortest sleep latency [19.25 (16.05, 22.45) minutes], while agricultural workers maintained their characteristically early sleep schedules [bedtime: 20:59 (20:53, 21:05); wake-up time: 5:02 (4:57, 5:07)] (Table 2).

DISCUSSION

This study characterized sleep duration and patterns among Chinese residents aged 15 years and older, yielding a weighted mean sleep duration of 7.24 [95% *CI*: 7.16, 7.32] hours. Prior research reported mean sleep durations of 7.38±1.37 hours among adults aged 30–79 between 2004 and 2008 (*3*), and 7.56±1.82 hours among adults aged 18 and older in the China Family Panel Studies (*4*). By comparison, the findings suggest a modest yet discernible downward trend in sleep duration over the past decade. Although an absolute decline of approximately 8 to 19 minutes may appear small, such a shift at the population level carries meaningful public health implications. This trend likely reflects the accelerating pace of modern life, intensifying socioeconomic competition, and the pervasive use of electronic devices — factors that collectively erode nocturnal sleep opportunity (*5*), rather than indicating temporal stability in population-level sleep behavior.

The findings also revealed distinct sociological patterning of sleep behaviors across demographic subgroups. Because physiological, social, and environmental factors shape sleep needs differently across the life course, notable variation emerges by age and sex. Among individuals aged 18–44, women slept longer than men on average, yet reported greater sleep latency and earlier bedtimes. This pattern may reflect the dual burden of occupational demands and domestic responsibilities that disproportionately falls on women (*6*), heightening pre-sleep cognitive arousal and thereby prolonging sleep onset. Earlier bedtimes, in turn, may represent a compensatory strategy to secure adequate rest despite competing pressures — particularly those associated with childcare and household management (*7*). Thus, the longer sleep durations observed in younger women likely stem from earlier sleep initiation as an offset against chronic sleep insufficiency. Among women aged 45–64, however, this pattern reversed: women in this group slept less than their male counterparts. This reversal may reflect the convergence of menopausal hormonal changes, peak career pressures, and shifting family roles — circumstances that collectively compromise sleep duration during this life stage (*8*).

TABLE 1. Sleep patterns of Chinese aged 15 and above with different characteristics — China, 2024.

Characteristics	Overall *N* (%)	Sleep duration $\bar{x}$ (hours) (95% *CI*)	*P*	Sleep latency $\bar{x}$ (min) (95% *CI*)	*P*	Bedtime $\bar{x}$ (95% *CI*)	*P*	Wake-up time $\bar{x}$ (95% *CI*)	*P*
Total	46,207 (100)	7.24 (7.16, 7.32)		27.45 (26.39, 28.51)		22:08 (21:58, 22:18)		6:18 (6:06, 6:30)	
Sex			0.03		<0.0001		<0.0001		<0.0001
Male	22,334 (48.33)	7.26 (7.19, 7.33)		25.08 (24.13, 26.03)		22:16 (22:04, 22:28)		6:24 (6:12, 6:36)	
Female	23,873 (51.67)	7.21 (7.11, 7.31)		29.89 (28.53, 31.25)		22:00 (21:51, 22:09)		6:12 (6:01, 6:23)	
Age, years			<0.0001		<0.0001		<0.0001		<0.0001
15–17	477 (4.28)	8.21 (8.02, 8.40)		25.33 (20.82, 29.84)		22:41 (22:31, 22:51)		7:48 (7:25, 8:11)	
18–44	11,416 (45.03)	7.57 (7.51, 7.63)		24.72 (23.67, 25.77)		22:38 (22:26, 22:50)		7:10 (7:02, 7:18)	
45–64	19,822 (34.42)	6.89 (6.82, 6.96)		27.83 (26.74, 28.92)		21:53 (21:47, 22:00)		6:05 (5:58, 6:12)	
≥65	14,492 (16.27)	6.79 (6.70, 6.88)		34.78 (32.95, 36.61)		21:10 (21:04, 21:16)		5:10 (5:05, 5:15)	
Residence			0.16		0.002		<0.0001		<0.0001
Urban	24,912 (53.91)	7.30 (7.18, 7.42)		25.91 (24.62, 27.20)		22:32 (22:19, 22:45)		6:39 (6:23, 6:55)	
Rural	21,295 (46.09)	7.19 (7.09, 7.29)		28.76 (27.54, 29.98)		21:49 (21:43, 21:55)		6:01 (5:54, 6:08)	
National region			<0.05		0.004		<0.0001		<0.0001
North China	6,864 (14.85)	7.11 (6.99, 7.23)		27.12 (25.95, 28.29)		22:02 (21:52, 22:12)		5:58 (5:45, 6:11)	
Northeast China	6,429 (13.91)	7.15 (7.08, 7.22)		26.12 (24.66, 27.58)		21:35 (21:21, 21:49)		5:36 (5:21, 5:51)	
East China	6,584 (14.25)	7.11 (6.97, 7.25)		27.90 (25.47, 30.33)		21:43 (21:26, 22:00)		6:33 (6:15, 6:51)	
Central China	6,677 (14.45)	7.40 (7.23, 7.57)		29.64 (28.07, 31.21)		21:42 (21:24, 22:00)		6:07 (5:47, 6:27)	
South China	6,551 (14.18)	7.27 (7.04, 7.50)		25.50 (23.00, 28.00)		23:01 (22:53, 23:09)		7:05 (6:52, 7:18)	
Southwest China	6,423 (13.90)	7.22 (7.03, 7.41)		29.95 (28.23, 31.67)		22:10 (21:52, 22:28)		6:25 (6:08, 6:42)	
Northwest China	6,679 (14.45)	7.40 (7.15, 7.65)		27.53 (24.09, 30.97)		22:12 (21:56, 22:28)		6:29 (6:15, 6:43)	
Education level			<0.0001		<0.0001		<0.0001		<0.0001
Primary school or below	15,531 (33.61)	6.83 (6.74, 6.92)		33.75 (32.02, 35.48)		21:21 (21:15, 21:27)		5:22 (5:17, 5:27)	
Junior high school	16,678 (36.09)	7.21 (7.13, 7.29)		26.64 (25.53, 27.75)		22:00 (21:53, 22:07)		6:08 (6:01, 6:15)	
High school/vocational school	6,876 (14.88)	7.44 (7.34, 7.54)		25.43 (24.25, 26.61)		22:26 (22:15, 22:37)		6:43 (6:30, 6:56)	
University/college or above	7,024 (15.20)	7.48 (7.40, 7.56)		24.55 (23.32, 25.78)		22:48 (22:37, 23:00)		7:03 (6:53, 7:13)	
Unknown	98 (0.21)	8.03 (7.73, 8.33)		23.95 (20.83, 27.07)		22:32 (22:02, 23:02)		7:28 (6:48, 8:08)	
Occupation			<0.0001		<0.0001		<0.0001		<0.0001
Agricultural workers	16,513 (35.74)	7.01 (6.89, 7.13)		29.84 (28.27, 31.41)		21:25 (21:19, 21:31)		5:28 (5:22, 5:34)	

Continued

Characteristics	Overall *N* (%)	Sleep duration $\bar{x}$ (hours) (95% *CI*)	*P*	Sleep latency $\bar{x}$ (min) (95% *CI*)	*P*	Bedtime $\bar{x}$ (95% *CI*)	*P*	Wake-up time $\bar{x}$ (95% *CI*)	*P*
Government/public institution staff	914 (1.98)	6.99 (6.81, 7.17)		25.89 (23.78, 28.00)		22:49 (22:36, 23:02)		6:37 (6:28, 6:46)	
Business/service employee	7,558 (16.36)	7.26 (7.15, 7.37)		24.72 (23.59, 25.85)		22:33 (22:20, 22:46)		6:37 (6:22, 6:52)	
Teaching staff	582 (1.26)	7.45 (7.29, 7.61)		24.22 (22.82, 25.62)		22:34 (22:23, 22:45)		6:47 (6:34, 7:00)	
Medical/health personnel	553 (1.20)	7.42 (7.30, 7.54)		24.43 (22.95, 25.91)		22:30 (22:21, 22:39)		6:37 (6:32, 6:42)	
Students	1,013 (2.19)	8.29 (8.16, 8.42)		23.67 (20.98, 26.36)		22:49 (22:38, 23:00)		7:53 (7:42, 8:04)	
Unemployed	5,656 (12.24)	7.24 (7.11, 7.37)		32.49 (30.48, 34.50)		21:52 (21:41, 22:03)		6:12 (6:00, 6:24)	
Retired	5,336 (11.55)	6.81 (6.68, 6.94)		29.72 (27.14, 32.30)		21:42 (21:30, 21:54)		5:34 (5:22, 5:46)	
Others	7,737 (16.74)	7.20 (7.10, 7.30)		26.70 (25.15, 28.25)		22:23 (22:09, 22:37)		6:28 (6:14, 6:42)	
Unknown	345 (0.75)	7.62 (7.40, 7.84)		22.06 (19.50, 24.62)		22:28 (22:13, 22:43)		6:51 (6:36, 7:06)	
Drink			<0.0001		0.84		0.86		0.0001
No	40,564 (87.79)	7.28 (7.20, 7.36)		27.47 (26.42, 28.52)		22:08 (21:57, 22:19)		6:20 (6:09, 6:31)	
Yes	5,643 (12.21)	6.91 (6.83, 6.99)		27.31 (25.45, 29.17)		22:08 (21:56, 22:20)		6:02 (5:48, 6:16)	
Smoking status			<0.0001		0.001		<0.0001		<0.0001
Never smoker	31,763 (68.75)	7.32 (7.23, 7.41)		27.83 (26.54, 29.12)		22:08 (21:57, 22:19)		6:22 (6:10, 6:34)	
Current smoker	10,358 (22.42)	7.08 (7.01, 7.15)		25.87 (24.91, 26.83)		22:17 (22:08, 22:26)		6:17 (6:07, 6:27)	
Former smoker	4,081 (8.83)	6.90 (6.81, 6.99)		28.81 (27.35, 30.27)		21:46 (21:36, 21:56)		5:39 (5:29, 5:49)	

Note: Regions were divided based on China's seven major geographic regions, including North China (Hebei), Northeast China (Liaoning), East China (Jiangsu), Central China (Henan), South China (Guangdong), Southwest China (Chongqing), and Northwest China (Shaanxi). In the occupation category, "Others" refers to occupations not included in the specific categories listed, while "Unknown" indicates that the occupation information was unavailable or could not be determined.
Abbreviation: *CI*=confidence interval.

TABLE 2. Sleep patterns across sex, residence, education levels, and occupations in different age groups — China, 2024.

Age groups (years)	Characteristics	Total	Sleep duration $\bar{x}$ (hours) (95% *CI*)	*P*	Sleep latency $\bar{x}$ (min) (95% *CI*)	*P*	Bedtime $\bar{x}$ (95% *CI*)	*P*	Wake-up time $\bar{x}$ (95% *CI*)	*P*
15–17	Sex			0.81		0.15		0.55		0.38
	Male	263	8.19 (7.95, 8.43)		27.74 (20.15, 35.33)		22:42 (22:31, 22:53)		7:44 (7:07, 8:21)	
	Female	214	8.23 (7.96, 8.50)		21.99 (19.74, 24.24)		22:38 (22:26, 22:50)		7:54 (7:36, 8:12)	
	Residence			0.02		0.30		0.09		0.53
	Urban	256	8.00 (7.78, 8.22)		28.08 (18.76, 37.40)		22:48 (22:39, 22:57)		7:38 (6:56, 8:20)	
	Rural	221	8.39 (8.14, 8.64)		23.02 (20.37, 25.67)		22:34 (22:20, 22:48)		7:57 (7:32, 8:22)	

Continued

Age groups (years)	Characteristics	Total	Sleep duration $\bar{x}$ (hours) (95% CI)	P	Sleep latency $\bar{x}$ (min) (95% CI)	P	Bedtime $\bar{x}$ (95% CI)	P	Wake-up time $\bar{x}$ (95% CI)	P
	Education level			0.93		0.61		<0.0001		0.001
	Primary school or below	2	8.10 (7.93, 8.27)		22.93 (19.57, 26.29)		20:48 (20:28, 21:08)		6:37 (5:57, 7:17)	
	Junior high school	271	8.22 (7.94, 8.50)		23.59 (20.73, 26.45)		22:49 (22:35, 23:03)		7:44 (7:27, 8:01)	
	High school/ Vocational school	193	7.76 (7.66, 7.86)		24.05 (22.72, 25.38)		22:42 (22:29, 22:55)		7:16 (7:05, 7:27)	
	University/ College or above	7	8.19 (7.26, 9.12)		18.65 (9.66, 27.64)		21:56 (20:45, 23:07)		6:47 (6:19, 7:15)	
	Unknown	4	8.02 (6.90, 9.14)		22.84 (20.95, 24.73)		23:11 (22:45, 23:37)		8:21 (6:23, 10:19)	
	Occupation			<0.0001		0.47		<0.0001		0.46
	Agricultural workers	3	10.70 (9.36, 12.04)		21.33 (19.31, 23.35)		21:41 (21:01, 22:21)		9:45 (7:27, 12:03)	
	Government/ public institution staff	–	–		–		–		–	
	Business/ service employee	6	8.86 (8.37, 9.35)		21.07 (15.52, 26.62)		21:49 (20:10, 23:28)		7:25 (6:13, 8:37)	
	Teaching staff	–	–		–		–		–	
	Medical/health personnel	–	–		–		–		–	
	Students	442	8.17 (7.97, 8.37)		25.17 (20.32, 30.02)		22:42 (22:32, 22:52)		7:39 (7:26, 7:52)	
	Unemployed	11	8.42 (7.98, 8.86)		22.73 (15.27, 30.19)		22:39 (21:46, 23:32)		7:37 (6:37, 8:37)	
	Retired	–	–		–		–		–	
	Others	13	8.80 (8.01, 9.59)		35.53 (31.33, 39.73)		22:19 (21:47, 22:51)		8:13 (6:59, 9:27)	
	Unknown	2	8.00 (7.06, 8.94)		25.33 (20.93, 29.73)		22:40 (22:02, 23:18)		7:30 (7:30, 7:30)	
18–44	Sex			<0.0001		0.0004		<0.0001		0.001
	Male	5,203	7.49 (7.41, 7.57)		23.56 (22.30, 24.82)		22:50 (22:37, 23:03)		7:15 (7:02, 7:28)	
	Female	6,213	7.66 (7.59, 7.73)		25.96 (24.78, 27.14)		22:26 (22:15, 22:37)		7:04 (6:56, 7:12)	
	Area			0.83		0.12		<0.0001		<0.0001
	Urban	7,997	7.58 (7.53, 7.63)		24.02 (22.58, 25.46)		22:56 (22:44, 23:08)		7:14 (7:03, 7:25)	
	Rural	3,419	7.56 (7.44, 7.68)		25.52 (24.29, 26.75)		22:31 (22:22, 22:40)		7:05 (6:56, 7:14)	
	Education level			<0.0001		0.47		<0.0001		<0.0001
	Primary school or below	639	7.31 (7.09, 7.53)		26.48 (23.69, 29.27)		22:01 (21:45, 22:17)		6:22 (6:08, 6:36)	
	Junior high school	3,318	7.47 (7.38, 7.56)		25.30 (23.78, 26.82)		22:20 (22:11, 22:29)		6:40 (6:33, 6:47)	
	High school/ Vocational school	2,239	7.76 (7.66, 7.86)		24.05 (22.72, 25.38)		22:42 (22:29, 22:55)		7:16 (7:05, 7:27)	

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Age groups (years)	Characteristics	Total	Sleep duration $\bar{x}$ (hours) (95% CI)	P	Sleep latency $\bar{x}$ (min) (95% CI)	P	Bedtime $\bar{x}$ (95% CI)	P	Wake-up time $\bar{x}$ (95% CI)	P
	University/ College or above	5,173	7.57 (7.50, 7.64)		24.48 (23.30, 25.66)		22:52 (22:40, 23:04)		7:12 (7:03, 7:21)	
	Unknown	47	8.23 (7.83, 8.63)		24.09 (20.07, 28.11)		22:55 (22:16, 23:34)		8:00 (7:15, 8:45)	
	Occupation			<0.0001		<0.0001		<0.0001		<0.0001
	Agricultural workers	1,466	7.56 (7.42, 7.70)		25.29 (23.34, 27.24)		21:50 (21:41, 21:59)		6:12 (6:04, 6:20)	
	Government/ public institution staff	531	7.07 (6.85, 7.29)		26.85 (24.55, 29.15)		22:57 (22:44, 23:10)		6:52 (6:42, 7:02)	
	Business/ service employee	3,932	7.43 (7.34, 7.52)		24.42 (23.06, 25.78)		22:44 (22:31, 22:57)		6:59 (6:46, 7:12)	
	Teaching staff	385	7.58 (7.40, 7.76)		23.87 (22.40, 25.34)		22:35 (22:23, 22:47)		6:57 (6:42, 7:12)	
	Medical/health personnel	373	7.51 (7.37, 7.65)		24.62 (22.95, 26.29)		22:32 (22:21, 22:43)		6:44 (6:38, 6:50)	
	Students	571	8.40 (8.28, 8.52)		22.17 (20.47, 23.87)		22:56 (22:41, 23:11)		8:06 (7:52, 8:20)	
	Unemployed	1,231	7.79 (7.64, 7.94)		27.24 (24.48, 30.00)		22:26 (22:13, 22:39)		7:12 (7:01, 7:23)	
	Retired	4	6.69 (6.54, 6.84)		26.14 (22.05, 30.23)		23:26 (23:15, 23:37)		6:43 (6:29, 6:57)	
	Others	2,757	7.48 (7.39, 7.57)		24.89 (23.23, 26.55)		22:48 (22:34, 23:02)		7:06 (6:54, 7:18)	
	Unknown	166	7.84 (7.59, 8.09)		19.94 (17.81, 22.07)		22:43 (22:29, 22:57)		7:13 (6:58, 7:28)	
45–64	Sex			<0.0001		<0.0001		<0.0001		<0.0001
	Male	9,538	6.97 (6.90, 7.04)		24.75 (23.85, 25.65)		21:57 (21:51, 22:03)		6:06 (5:58, 6:14)	
	Female	10,284	6.82 (6.72, 6.92)		30.90 (29.47, 32.33)		21:49 (21:44, 21:54)		6:05 (5:59, 6:11)	
	Area			0.19		0.004		<0.0001		<0.0001
	Urban	9,982	6.95 (6.83, 7.07)		26.17 (25.15, 27.19)		22:12 (22:05, 22:19)		6:22 (6:17, 6:27)	
	Rural	9,840	6.85 (6.76, 6.94)		29.01 (27.41, 30.61)		21:39 (21:34, 21:44)		5:54 (5:49, 5:59)	
	Education level			0.002		<0.0001		<0.0001		<0.0001
	Primary school or below	6,191	6.75 (6.65, 6.85)		31.88 (29.93, 33.83)		21:35 (21:29, 21:41)		5:26 (5:20, 5:32)	
	Junior high school	9,114	6.93 (6.84, 7.02)		26.93 (25.66, 28.20)		21:47 (21:42, 21:52)		5:40 (5:35, 5:45)	
	High school/ Vocational school	2,961	6.95 (6.88, 7.02)		25.17 (23.98, 26.36)		22:13 (22:05, 22:21)		5:59 (5:48, 6:10)	
	University/ College or above	1,533	7.01 (6.86, 7.16)		24.64 (22.54, 26.74)		22:36 (22:25, 22:47)		6:19 (6:09, 6:29)	
	Unknown	23	7.21 (6.71, 7.71)		25.33 (19.76, 30.90)		21:52 (21:12, 22:32)		6:02 (5:25, 6:39)	
	Occupation			0.48		<0.0001		<0.0001		<0.0001

Continued

Age groups (years)	Characteristics	Total	Sleep duration $\bar{x}$ (hours) (95% CI)	P	Sleep latency $\bar{x}$ (min) (95% CI)	P	Bedtime $\bar{x}$ (95% CI)	P	Wake-up time $\bar{x}$ (95% CI)	P
	Agricultural workers	8,177	6.88 (6.77, 6.99)		29.11 (27.62, 30.60)		21:29 (21:23, 21:35)		5:23 (5:17, 5:29)	
	Government/ public institution staff	359	6.79 (6.62, 6.96)		23.20 (20.02, 26.38)		22:33 (22:18, 22:48)		6:04 (5:52, 6:16)	
	Business/ service employee	3,281	6.89 (6.78, 7.00)		25.23 (24.09, 26.37)		22:12 (22:02, 22:22)		5:54 (5:41, 6:07)	
	Teaching staff	168	6.82 (6.68, 6.96)		25.96 (22.29, 29.63)		22:40 (22:29, 22:51)		6:10 (5:57, 6:23)	
	Medical/health personnel	160	7.20 (6.85, 7.55)		23.89 (21.50, 26.28)		22:22 (22:12, 22:32)		6:12 (5:59, 6:25)	
	Students	–	–		–		–		–	
	Unemployed	2,246	6.90 (6.71, 7.09)		32.95 (30.37, 35.53)		21:51 (21:43, 21:59)		5:50 (5:38, 6:02)	
	Retired	2,080	6.93 (6.80, 7.06)		27.61 (24.46, 30.76)		21:50 (21:38, 22:02)		5:46 (5:35, 5:57)	
	Others	3,257	6.89 (6.78, 7.00)		26.10 (24.70, 27.50)		22:09 (22:01, 22:17)		5:55 (5:47, 6:03)	
	Unknown	94	7.13 (6.65, 7.61)		26.06 (21.19, 30.93)		22:18 (21:52, 22:44)		6:21 (5:58, 6:44)	
≥65	Sex			<0.0001		<0.0001		0.34		0.04
	Male	7,330	6.96 (6.86, 7.06)		29.53 (28.11, 30.95)		21:11 (21:04, 21:18)		5:43 (5:38, 5:48)	
	Female	7,162	6.64 (6.54, 6.74)		39.49 (36.72, 42.26)		21:08 (21:01, 21:15)		5:46 (5:42, 5:50)	
	Area			0.40		0.07		<0.0001		0.003
	Urban	6,677	6.74 (6.62, 6.86)		32.64 (30.07, 35.21)		21:29 (21:21, 21:37)		5:54 (5:46, 6:02)	
	Rural	7,815	6.82 (6.69, 6.95)		35.88 (33.48, 38.28)		21:00 (20:52, 21:08)		5:39 (5:34, 5:44)	
	Education level			0.06		<0.0001		<0.0001		<0.0001
	Primary school or below	8,699	6.79 (6.68, 6.90)		37.40 (34.92, 39.88)		20:58 (20:51, 21:05)		5:05 (4:59, 5:11)	
	Junior high school	3,975	6.85 (6.76, 6.94)		31.34 (29.79, 32.89)		21:17 (21:10, 21:24)		5:14 (5:08, 5:20)	
	High school/ Vocational school	1,483	6.65 (6.53, 6.77)		30.81 (28.03, 33.59)		21:39 (21:30, 21:48)		5:22 (5:14, 5:30)	
	University/ College or above	311	6.75 (6.48, 7.02)		27.76 (23.71, 31.81)		22:00 (21:44, 22:16)		5:45 (5:34, 5:56)	
	Unknown	24	7.98 (6.44, 9.52)		22.65 (19.76, 25.54)		20:23 (19:18, 21:28)		5:06 (4:46, 5:26)	
	Occupation			0.0006		<0.0001		<0.0001		<0.0001
	Agricultural workers	6,867	6.81 (6.67, 6.95)		34.59 (31.99, 37.19)		20:59 (20:53, 21:05)		5:02 (4:57, 5:07)	
	Government/ public institution staff	24	6.79 (5.94, 7.64)		33.81 (27.88, 39.74)		21:37 (20:55, 22:19)		5:17 (4:28, 6:06)	
	Business/ service employee	339	6.73 (6.56, 6.90)		28.16 (22.63, 33.69)		21:24 (21:14, 21:34)		5:01 (4:51, 5:11)	

Continued

Age groups (years)	Characteristics	Total	Sleep duration $\bar{x}$ (hours) (95% *CI*)	*P*	Sleep latency $\bar{x}$ (min) (95% *CI*)	*P*	Bedtime $\bar{x}$ (95% *CI*)	*P*	Wake-up time $\bar{x}$ (95% *CI*)	*P*
	Teaching staff	28	7.52 (7.01, 8.03)		19.25 (16.05, 22.45)		21:24 (21:08, 21:40)		5:31 (5:21, 5:41)	
	Medical/health personnel	20	6.67 (6.01, 7.33)		20.77 (15.50, 26.04)		21:43 (21:20, 22:06)		5:12 (4:36, 5:48)	
	Students	–	–		–		–		–	
	Unemployed	2,168	6.88 (6.73, 7.03)		40.07 (36.77, 43.37)		21:00 (20:48, 21:12)		5:14 (5:05, 5:23)	
	Retired	3,252	6.70 (6.56, 6.84)		31.77 (28.90, 34.64)		21:33 (21:20, 21:46)		5:22 (5:10, 5:34)	
	Others	1,710	6.79 (6.61, 6.97)		35.98 (32.13, 39.83)		21:09 (20:53, 21:25)		5:10 (5:00, 5:20)	
	Unknown	84	7.05 (6.42, 7.68)		28.33 (27.60, 29.06)		21:08 (20:46, 21:30)		5:20 (4:50, 5:50)	

Note: In the occupation category, "Others" refers to occupations not included in the specific categories listed, while "Unknown" indicates that the occupation information is unavailable or could not be determined, "–" denotes not applicable for this age group.
Abbreviation: *CI*=confidence interval.

Among adolescents aged 15–17, rural residents slept significantly longer than their urban peers, a difference likely attributable to lower academic pressure, fewer extracurricular commitments, and reduced social demands in rural environments. Across other age groups, urban–rural disparities manifested primarily in sleep timing rather than duration: rural populations consistently retired earlier, a pattern that probably reflects the extended work hours and active nightlife characteristic of urban settings. Among highly educated individuals, later bedtimes coexisted with shorter sleep latency and longer total sleep duration — a pattern suggesting that greater health literacy and access to resources may enable more restorative sleep even within a compressed nocturnal window (*9*–*10*). Agricultural workers across all adult age groups maintained consistently early bedtimes, presumably in response to the demands of early morning labor schedules. Whether such early sleep timing confers benefits for overall sleep quality remains an important question for future investigation.

This study has several limitations. First, the cross-sectional design precludes causal inference. Second, reliance on self-reported sleep data introduces the potential for recall and social-desirability bias; future research would benefit from incorporating objective measures such as actigraphy. Third, because military personnel and institutionalized individuals were excluded from the sampling frame, the findings primarily generalize to the community-dwelling population. Fourth, certain occupational categories had relatively small sample sizes, which may yield unstable estimates and wider confidence intervals; findings for these categories should therefore be interpreted with caution. Finally, although the four selected sleep indicators provide valuable macroscopic insights into population-level sleep timing and quantity, they do not capture all dimensions of sleep health. Future studies should employ comprehensive, validated questionnaires or objective clinical measures — such as polysomnography — to enable a more thorough evaluation of sleep.

This study revealed substantial heterogeneity in sleep patterns among Chinese residents aged 15 years and above, with marked variation according to age, sex, geographic location, and socioeconomic status. Effective interventions must therefore adopt population-specific strategies rather than relying on universal guidelines. Policies should address the psychological burdens and work–life imbalances that contribute to prolonged sleep latency, particularly among women. Healthcare systems must also recognize how the convergence of occupational demands and menopausal transitions jointly undermine sleep in middle-aged women. Public health messaging should account for urban–rural disparities in sleep timing and lifestyle, promoting sleep hygiene practices that are compatible with occupational realities — including the early daily routines of agricultural workers. Ultimately, fostering sleep-conducive environments across diverse population segments requires tailored approaches that acknowledge the multifaceted determinants of sleep behavior.

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