Social Medicine and Health Management (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/socmhm.2025.060104
ISSN 2616-2210 Vol. 6 Num. 1

A Study on Sleep Quality across Different Age and Gender Groups during the Spring Festival

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Keywords: Sleep Quality, Age, Gender, Spring Festival

Abstract: Sleep quality is a globally recognized issue, yet the sleep quality of different age and gender groups during the Chinese traditional Spring Festival remains unclear. This study utilized the Pittsburgh Sleep Quality Index (PSQI) to investigate the sleep quality of various age and gender groups during the Spring Festival. The results indicated that the overall PSQI scores, and the scores of different age and gender groups were above 7, with proportion of participants with poor sleep qualitys exceeding 50% for both males and females, as well as for the 18-30 and >30 age groups. Gender did not affect the total PSQI score or other factor scores, while age only influenced sleep disturbance and Sleep Medication Use scores, with the >30 age group scoring the highest in these areas. Sleep disturbance scores, Sleep Medication Use scores, and total PSQI scores were positively correlated with age, and Daytime Sleepiness scores were also positively correlated with gender. The conclusion is that sleep quality is generally poor during the Spring Festival; women face a higher risk of Daytime Sleepiness compared to men, but both genders share similar sleep quality; and as age increases, sleep quality worsens, particularly in terms of nighttime sleep disturbances and Sleep Medication Use.

1. Introduction

Sleep is an essential part of human life. The World Health Organization (WHO) has long included "good sleep quality" as a health standard, sparking a surge in sleep quality research. Previous studies have shown that sleep affects human health by regulating the endocrine system, nervous system, inflammatory responses, and metabolism. Good sleep refers to the optimal state of health, including 7-9 hours of sleep duration and high sleep quality; poor health is associated with sleep durations of less than 7 hours or more than 9 hours and poor sleep quality. Thus, sleep quality is a crucial indicator of health status. A WHO global sleep epidemiology study found that 27% of the global population experiences sleep quality issues, with 43% of over 10,000 surveyed Chinese individuals reporting sleep problems[1]. This indicates that sleep problems are prevalent globally but more so in China. Good sleep helps restore energy and repair damaged tissues, while poor sleep or sleep deprivation can impair attention, behavioral stability, hinder disease recovery, and even induce physiological or psychological illnesses. Therefore, focusing on the sleep quality of the Chinese population can help improve national health levels.

Previous studies have shown that Chinese women generally have poorer sleep quality than men.

Wang, Y (2020) studied the relationship between sleep and coronary heart disease in rural populations in Henan, finding a 21.8% prevalence of sleep disorders overall, with women having significantly poorer sleep quality than men, and those with coronary heart disease having significantly higher sleep quality scores than those without[2]. Zhang, J. S (2012) investigated sleep quality among college students, finding a 19.7% prevalence of sleep disorders, with female students scoring significantly higher in sleep efficiency and Daytime Sleepiness than male students[3]. Sun, F. F (2021) also found that female middle school students had significantly poorer sleep quality than male students[4]. Thus, whether in adult or student populations, women tend to have more pronounced sleep quality issues than men.

In addition to gender, age is a significant factor affecting sleep quality. Among students, Sun, F. F (2021) found that sleep quality tends to worsen with higher grades in middle school students; Huang, Z. Y et al. (2022) found a 24.2% prevalence of sleep disorders among high school students, with higher rates in senior grades, and factors such as interpersonal sensitivity, depression, anxiety, academic pressure, family pressure, and interpersonal pressure significantly affecting sleep quality[5]; Xu, Q. S (2022) found that sleep quality scores increased progressively from freshman to junior year among college students, indicating worsening sleep quality[6]. Among adults, Sun, W. T (2020) found that 30.74% of the permanent population aged 18 and above in Hebei Province had poor sleep quality, with sleep quality decreasing from youth to middle age and old age[7]; Suo, Y. F (2017) studied sleep quality across different age groups in Beijing, finding significant differences in sleep duration, sleep disturbance, Sleep Medication Use, and Daytime Sleepiness scores among age groups (18-30, 31-44, ≥45), with sleep duration and disturbance scores increasing with age[8]. In summary, sleep quality varies across age groups and tends to worsen with age.

Notably, previous studies on sleep quality have been conducted under normal circumstances. However, it remains unclear whether sleep quality during special holidays, particularly the Chinese Spring Festival, differs from normal times. It is also unclear whether women continue to face higher risks of sleep quality issues during the Spring Festival and whether sleep quality continues to decline with age. Therefore, this study investigates the sleep quality of different gender and age groups (<18, 18-30, >30) during the Spring Festival to understand the sleep quality of the Chinese population during this period.

Although there is no unified definition of sleep quality, the Pittsburgh Sleep Quality Index (PSQI) is commonly used internationally to assess sleep quality. Developed by Buysse DJ et al.(1989) at the University of Pittsburgh Medical Center's Sleep and Circadian Rhythm Research Center[9], the PSQI is used to evaluate an individual's sleep quality over the past month. It consists of 19 self-rated items and 5 other-rated items, with the 19th item and the 5 other-rated items not included in the scoring. The remaining 18 self-rated items are divided into seven components: subjective sleep quality, Subjective sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication, and Daytime Sleepiness. Each component is scored from 0 to 3 ("0" indicating no difficulty, "1" indicating mild difficulty, "2" indicating moderate difficulty, "3" indicating severe difficulty). The sum of these seven component scores constitutes the total PSQI score, with higher scores indicating poorer sleep quality. Liu, X. C et al. (1996) have validated the PSQI for use in the Chinese population[10], indicating its suitability for assessing sleep quality in China[11-13].

2. Research Methods

2.1 Participants

Participants were randomly selected through an online questionnaire. A total of 207 participants completed the survey, with 176 valid responses, including 68 males and 108 females, with an average age of 24.20±7.21. There were 15 participants under 18, 136 aged 18-30, and 25 over 30.

2.2 Methods

A questionnaire survey method was used. The questionnaire was distributed via the online platform and included demographic information (gender, age) and the Pittsburgh Sleep Quality Index (PSQI) with 20 items. Items 19-20 were demographic information and not included in the scoring; the remaining 18 items were PSQI content and were scored. The scoring criteria were: PSQI total score ≤3, indicating good sleep quality; 3 < PSQI total score ≤7, indicating moderate sleep quality; PSQI total score >7, indicating poor sleep quality and the presence of sleep disorders[14].

2.3 Statistical Methods

Data were entered using Excel, and questionnaires with obvious errors or logical inconsistencies were excluded. SPSS 19.0 was used for two-way ANOVA and correlation analysis on the valid data.

3. Research Results

3.1 Basic Sleep Quality Information

Detailed data on the sleep quality of the Chinese population during the Spring Festival are shown in Table 1. The results indicate that the overall PSQI score of the participants was above 7, with a proportion of participants with poor sleep quality of 53.41% (the proportion of participants with a PSQI score >7), indicating that the overall sleep quality of the participants was poor, and more than half had sleep disorders.

In terms of gender, the male PSQI score was also above 7, with a proportion of participants with poor sleep quality of 55.88% (the proportion of males with a PSQI score >7), while the female PSQI score was above 8, with a proportion of participants with poor sleep quality of 57.41% (the proportion of females with a PSQI score >7). The results show that both gender groups had poor sleep quality during the Spring Festival, and most individuals had sleep disorders. Among the three age groups, the <18 group had the lowest PSQI score, with a proportion of participants with poor sleep quality of 40.00% (the proportion of <18 participants with a PSQI score >7); the 18-30 group had the second-highest PSQI score, with a proportion of participants with poor sleep quality of 52.94% (the proportion of 18-30 participants with a PSQI score >7); the >30 group had the highest PSQI score, with a proportion of participants with poor sleep quality of 52.00% (the proportion of >30 participants with a PSQI score >7). It is evident that as age increases, PSQI scores tend to rise, indicating poorer overall sleep quality, and this trend is also observed in Subjective sleep latency, sleep duration, sleep disturbances, Sleep Medication Use, and Daytime Sleepiness; most individuals in the 18-30 and >30 groups had poor sleep quality . Detailed data are shown in Table 1.

Table 1: PSQI Factor Scores for Total Participants and Different Genders and Ages

Factor	Total *M*(*SD*) (176)	Gender *M*(*SD*)		Age *M*(*SD*)		
		Male (68)	Female (108)	<18 (15)	18-30 (136)	>30 (25)
Subjective Sleep Quality	1.10(0.76)	1.00(0.73)	1.17(0.77)	1.27(0.59)	1.05(0.71)	1.28(1.02)
Subjective Sleep Latency	1.47(0.89)	1.46(0.94)	1.47(0.87)	1.27(0.96)	1.47(0.92)	1.56(0.71)
Sleep Duration	0.58(0.90)	0.60(1.00)	0.56(0.84)	0.40(0.83)	0.57(0.90)	0.72(0.94)
Sleep Efficiency	1.89(1.45)	1.99(1.43)	1.83(1.47)	2.20(1.37)	1.92(1.45)	1.56(1.53)
Sleep Disturbances	1.26(0.63)	1.18(0.65)	1.31(0.62)	1.00(0.66)	1.24(0.61)	1.56(0.65)
Use of Hypnotic Drugs	0.34(0.70)	0.35(0.66)	0.32(0.72)	0.07(0.26)	0.29(0.68)	0.72(0.84)
Daytime Sleepiness	1.35(0.96)	1.18(0.99)	1.45(0.92)	1.07(0.88)	1.34(0.97)	1.56(0.92)
Total Score	7.98(2.70)	7.75(2.59)	8.13(2.72)	7.27(2.76)	7.88(2.56)	8.96(2.67)

3.2 Gender and Age Differences

Gender and age were selected as independent variables, and subjective sleep quality, Subjective sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of hypnotic drugs, Daytime Sleepiness scores, and total scores were selected as dependent variables for a 2 (gender: male, female)×3 (age: <18, 18-30, >30) two-way ANOVA. The results are shown in Table 2. The main effect of gender was not significant for subjective sleep quality, Subjective sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of hypnotic drugs, Daytime Sleepiness scores, or total scores; the main effect of age was not significant for subjective sleep quality, Subjective sleep latency, sleep duration, sleep efficiency, Daytime Sleepiness scores, or total scores, but was significant for sleep disturbances and use of hypnotic drugs; the interaction effect of gender and age was not significant for any of the factors. Pairwise comparisons of sleep disturbances and use of hypnotic drugs across age groups are shown in Table 3: for sleep disturbances and use of hypnotic drugs, the <18 and 18-30 groups scored significantly lower than the >30 group; for total PSQI scores, the <18 and 18-30 groups scored marginally lower than the >30 group; other comparisons were not significant. The results indicate that the >30 group scored lower only in total PSQI scores, sleep disturbances, and use of hypnotic drugs compared to other age groups, while other PSQI-related scores were not affected by gender or age.

Table 2: Age and Gender Differences in PSQI Factors

	Gender		Age		Gender ×Age	
Factor	F(1,170)	p	F(2,170)	p	F(2,170)	p
Subjective Sleep Quality	1.33	0.251	1.60	0.206	0.28	0.758
Subjective Sleep Latency	0.62	0.432	0.44	0.642	0.80	0.452
Sleep Duration	0.22	0.641	0.62	0.538	0.08	0.921
Sleep Efficiency	0.05	0.830	1.06	0.348	0.14	0.869
Sleep Disturbances	0.01	0.905	4.70	0.010	0.97	0.380
Use of Hypnotic Drugs	0.20	0.657	5.10	0.007	1.54	0.217
Daytime Sleepiness	0.30	0.585	1.40	0.250	0.55	0.579
Total Score	0.43	0.515	2.40	0.098	0.29	0.748

Table 3: LSD Results of PSQI Factors Across Age Groups (p)

Factor		<18	18-30
Subjective Sleep Quality	18-30	0.296	
	>30	0.957	0.166
Subjective sleep latency	18-30	0.404	
	>30	0.318	0.647
Sleep Duration	18-30	0.479	
	>30	0.277	0.455
Sleep Efficiency	18-30	0.478	
	>30	0.179	0.257
Sleep Disturbances	18-30	0.165	
	>30	0.006	0.017
Use of Hypnotic Drugs	18-30	0.221	
	>30	0.004	0.005
Daytime Sleepiness	18-30	0.297	
	>30	0.115	0.287
Total Score	18-30	0.394	
	>30	0.052	0.063

3.3 Correlation between PSQI and Gender, Age

Pearson correlation analysis was conducted between gender and age and subjective sleep quality, Subjective sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of hypnotic drugs, Daytime Sleepiness scores, and total scores. The results are shown in Table 4: sleep disturbance scores were significantly positively correlated with age, Sleep Medication Use scores were significantly positively correlated with age, and total PSQI scores were significantly positively correlated with age; Daytime Sleepiness scores were marginally positively correlated with gender (p=0.069); other correlations were not significant. These results indicate that sleep disturbance scores, Sleep Medication Use scores, and total PSQI scores increase with age, and women tend to have higher Daytime Sleepiness scores than men.

Table 4: Correlation Coefficients between PSQI Factors and Gender, Age (r)

	Subjective Sleep Quality	Subjective sleep latency	Sleep Duration	Sleep Efficiency	Sleep Disturbances	Use of Hypnotic Drugs	Daytime Sleepiness	Total Score
Age	-0.01	0.07	0.10	-0.11	**0.24****	**0.26****	0.127	**0.15***
Gender	0.12	<0.01	0.03	-0.05	0.12	-0.07	**0.14**	0.08

Note: *p<0.05, **p<0.01.

4. Discussion

In this study, the overall PSQI score was close to 8, and more than half of the participants had sleep disorders, indicating that sleep quality is generally poor during the Spring Festival, with prevalent sleep disorders. The reasons for this may include disrupted daily eating habits and lifestyles due to the festive atmosphere[15], leading to decreased sleep quality. For example, food safety issues are more common during the Spring Festival than at other times, and people tend to indulge in overeating, which can lead to health problems that affect sleep quality; the likelihood of travel increases during the Spring Festival, and the excitement and issues encountered during travel can also affect sleep quality[16]; most importantly, the frequency and duration of staying up late increase during the Spring Festival, disrupting normal sleep patterns[17].These factors may contribute to decreased sleep quality during the Spring Festival, but further research is needed to explore the reasons.

This study found no significant differences in total PSQI scores or factor scores between males and females, indicating that sleep quality is similar between genders during the Spring Festival, which contradicts previous findings[3]. The lack of gender differences in sleep quality may be due to the unique nature of the Spring Festival, during which the lifestyles and dietary habits of men and women may converge as they engage in similar celebratory activities. However, this study found that women tend to have higher Daytime Sleepiness scores than men, indicating a greater risk of Daytime Sleepiness issues for women, consistent with previous research[3]. Baker et al. (2010) suggest that women are more prone to sleep disorders due to increased estrogen levels, which can exacerbate sleep issues during puberty, childbearing years, menopause, and menstruation[18]; Xie, C et al. (2015) suggest that women's personality traits also affect sleep[19], as Wang, K et al. (2016) found that poor sleep quality may be related to more negative emotions and fewer positive emotions[20], and Jiang, G. Y (2014) found that women have fewer positive emotions than men and are more sensitive to negative emotional information[21]. Zhang, X. Y et al. (2006) found that men have higher self-esteem and better psychological resilience than women, enabling them to effectively resist external disturbances[22]. Therefore, women's relatively stable traits may persist during the Spring Festival, making them more prone to feeling tired and lacking energy.

In this study, the >30 age group had the lowest PSQI scores, sleep disturbance scores, and Sleep Medication Use scores, and these scores were positively correlated with age. This indicates that sleep quality worsens with age, particularly in terms of sleep disturbances and Sleep Medication Use, consistent with Wen, C and Ding, L. J(2010) findings[23]. Even during the Spring Festival, older adults have the poorest sleep quality, with more severe sleep disturbances and greater reliance on hypnotic drugs. This may be because, as in normal times, older adults bear more responsibilities and pressures, such as financial, interpersonal, family, and work-related pressures. Additionally, Wang, K et al. (2016) found that young adults have better emotional self-regulation and coping strategies than middle-aged adults, and anxiety and depression significantly affect sleep quality[24], leading to fewer negative emotions. Therefore, older adults face greater responsibilities and pressures than younger individuals and have poorer emotional regulation, which may contribute to more severe sleep quality issues.

5. Conclusions

In summary, sleep quality is generally poor during the Spring Festival, with prevalent sleep disorders; men and women have similar sleep quality, but women face a greater risk of Daytime Sleepiness; and as age increases, overall sleep quality worsens, particularly in terms of more severe sleep disturbances and increased use of hypnotic drugs. The findings of our study further complement and expand upon previous research on sleep quality, laying the groundwork for future investigations.

6. Limitations and Future Directions

This study focused solely on the sleep quality of different groups during the Chinese Spring Festival and did not compare the sleep quality of the same groups during normal periods, resulting in a somewhat limited scope. Additionally, the number of participants in the questionnaire survey was relatively small, and there were significant differences in the number of participants across age groups. In the future, we plan to increase the comparison of sleep quality between normal periods and the Spring Festival or other holidays, as well as increase the number of participants to obtain more scientifically reliable results. Furthermore, future research will continue to explore the factors influencing sleep quality during the Spring Festival, with the aim of gaining a more comprehensive understanding of sleep quality during this period.

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