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Understanding Factors Associated With Sleep Quality in Korean American Older Adults Residing in Subsidized Senior Housing

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ABSTRACT

PURPOSE: Sleep quality is crucial for older adults, yet many experience poor sleep due to physical, mental, and social factors. The current study addresses the research gap on sleep quality among Korean American older adults in senior housing by examining relevant factors.

METHOD: Using data from 314 Korean American residents in Los Angeles senior housing, we conducted descriptive analysis and logistic regression models.

RESULTS: Poor sleep was significantly associated with poor physical health (odds ratio [OR] = 4.89), low energy (OR = 7.92), severe pain (OR = 14.92), multiple chronic conditions (OR = 2.71), and poor mental health (OR = 5.82), including moderate to severe anxiety (OR = 4.71) and depression (OR = 5.11).

CONCLUSION: Findings emphasize the unique sleep needs of Korean American older adults in senior housing and provide insights to improve their well-being. The study also highlights the need for further research using longitudinal designs, broader samples, and comprehensive sleep measures.

Sleep quality is vital for physical health, cognitive function, and overall well-being; as individuals age, they experience natural changes in sleep patterns as well as an increased prevalence of sleep problems (e.g., insomnia, insufficient sleep duration) that directly compromise sleep quality (Lucey et al., 2019). Approximately 30% of older adults consistently sleep <7 hours, which is less than the recommended amount by the National Sleep Foundation (Hirshkowitz et al., 2015), whereas 13% experience frequent insomnia and 18% experience frequent insomnia and poor sleep quality (Gordon et al., 2022). Sleep fragmentation reduces deep sleep, and increased nighttime awakenings further deteriorate sleep quality in this population (Mander et al., 2017). Understanding how these various sleep problems specifically influence sleep quality in older adults is essential for developing targeted interventions to improve their quality of life and ensure a healthier, more fulfilling aging process.

Physical, mental, and social factors all contribute to the multifaceted issue of sleep quality in older adults (Gothe et al., 2020). Physical factors, such as reduced activity, chronic pain, and urinary incontinence, can signifi-

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Disclosure: The authors have disclosed no potential conflicts of interest, financial or otherwise.

Funding: Data collection was supported by a grant from the National Institute of Dental and Craniofacial Research (R21DE029579, PI: Yuri Jang, PhD).

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Submitted: December 9, 2024. Accepted: May 9, 2025. Published online: May 27, 2025.

doi: 10.3928/00989134-20250519-01

cantly disrupt sleep (Nazaripanah et al., 2018). Importantly, this relationship often manifests as a vicious cycle, where poor sleep quality exacerbates conditions, such as chronic pain, which in turn further disrupts sleep patterns (Smith & Haythornthwaite, 2004).

As sleep quality declines with age, the risk for diseases, including diabetes, Alzheimer's disease, and cancer, increases (Mander et al., 2017). Depression and anxiety further impact sleep by causing low sleep efficiency, sleep fragmentation, and daytime sleepiness in older populations (Corbo et al., 2023). Negative social factors, such as loneliness and inadequate support, affect sleep disturbances (Azizi-Zeinalhajlou et al., 2022), and socioeconomic disparities further contribute to poorer sleep quality (Billings et al., 2021).

There has been a significant gap in research on sleep quality among Korean American older adults (Song et al., 2022). Although there are approximately 277,000 Korean Americans aged ≥65 years in the United States (U.S. Census Bureau, 2023), they remain underrepresented in sleep studies. The unique cultural and socioeconomic characteristics of Korean American older adults, especially those in low-income senior housing, may impact their sleep health in a unique way compared to other racial or ethnic groups (Grandner et al., 2016).

The current study aims to fill this gap by examining factors associated with sleep quality among Korean older adult residents of senior housing. The factors considered included indicators of physical health (e.g., physical health rating, chronic conditions, energy level, pain level, urinary incontinence), mental health (e.g., mental health rating, anxiety, depression), and social relationships (e.g., social isolation, loneliness). Given the critical role of gender in sleep quality among older adults (Decker et al., 2022), we also tested for potential effect modification by gender. Our exploration of sleep quality within this specific population will contribute to better understanding of sleep and overall well-being of Korean American older adults in senior housing settings and provide implications for addressing specific sleep-related needs of this demographic.

METHOD

Study Sample

We used purposive sampling to survey Korean American residents in subsidized senior housing across the greater Los Angeles area, which has the largest Korean American population in the United States. We identified target facilities from our area resource database and, with local social service providers' input, shortlisted those within a 20-mile radius of our research site. We aimed for at least 300 participants to ensure adequate power for multivariate analyses of key contextual variables, and between April and June 2023, we successfully gathered data from 351 participants across six facilities.

The survey comprised a 10-page structured paper questionnaire. Although available in English and Korean, all participants opted for Korean, with bilingual, bicultural assistants available as needed. Surveys were conducted in common areas, such as meeting rooms and cafeterias.

After completing the questionnaire, trained researchers assessed participants' cognitive function using the Mini Mental State Examination (MMSE; Folstein et al., 1975) in Korean. Participants with severe cognitive impairment (MMSE score ≤10) were excluded to ensure that all respondents had the capacity to understand and accurately answer the study questions (Tombaugh & McIntyre, 1992). Eligibility criteria were: (a) self-identified as Korean American; (b) age ≥65 years; (c) residence in the participating facility; and (d) ability to read, understand, and sign a consent form. Our research team visited each location on prearranged dates. After applying these criteria, the sample comprised 315 participants; one with missing sleep data was excluded, resulting in a final sample of 314. According to the Institutional Review Board–approved protocol, participants were briefed on the study's objectives and procedures and provided informed consent.

Variables

Independent variables were selected based on prior literature and their hypothesized links to poor sleep, focusing on physical, mental, and social factors affecting sleep (Decker et al., 2022; Grandner et al., 2016; Mander et al., 2017), and key covariates were chosen to control for confounding influences and improve the accuracy of the analysis.

Dependent Variable. Sleep Quality. Although using multi-item validated tools is ideal for capturing more comprehensive aspects of sleep quality, single-item measures remain a practical option in research aiming to reduce respondent fatigue (Hofmeister et al., 2020). Participants were asked to self-evaluate their sleep quality by responding to the question, "How would you rate your sleep quality?" They could choose from the following options: *excellent*, *very good*, *good*, *fair*, and *poor*. These responses were categorized into two groups: 0 = excellent/very good/good sleep quality and 1 = fair/poor sleep quality.

Independent Variables. Physical Health Rating. Self-rated health was assessed with the question: "How would you rate your overall health?" Responses originally given on a 5-point scale were dichotomized, with 0 = excellent/very good/good health and 1 = fair/poor health.

Number of Chronic Conditions. Participants were asked to check boxes for 10 chronic diseases (high blood pressure, heart disease, stroke, diabetes, cancer, arthritis, liver disease, nephritis, asthma, chronic lung disease). We categorized them into three categories: no chronic condition, 1 to 2 chronic conditions, and ≥3 chronic conditions.

Energy Level. Participants were asked to self-rate their energy level by answering the question, "How would you rate your overall energy level?" Responses were categorized on a 3-point scale: 0 = excellent/very good, 1 = good, and 2 = fair/poor.

Pain Level. Participants were asked to self-rate their pain level by answering the question, "How would you rate your overall level of pain?" Responses were categorized on a 3-point scale: 0 = no pain, 1 = mild/minor/moderate pain, and 2 = strong/very strong pain.

Urinary Incontinence. Participants were asked how frequently they experienced involuntary urine leakage or loss of bladder control. Responses were recorded on a 3-point scale: 0 = never, 1 = occasionally, and 2 = frequently/always.

Mental Health Rating. Participants were asked to self-rate their mental health by responding to the question, "How would you describe your mental health?" They could choose from the following options: *excellent*, *very good*, *good*, *fair*, and *poor*. Responses were categorized into two groups: 0 = excellent/very good/good mental health and 1 = fair/poor mental health.

Anxiety. Anxiety was assessed using the seven-item Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006), a tool designed to screen for generalized anxiety disorder. Participants rated how frequently they were bothered by each symptom over the past 2 weeks, including "feeling nervous, anxious, or on edge," "not being able to stop or control worrying," "worrying too much about different things," and "trouble relaxing." Each item was scored on a 4-point scale ranging from 0 (*never*) to 3 (*nearly every day*), yielding total scores between 0 and 21, with higher scores indicating greater anxiety levels. The Korean version of the GAD-7 has been validated, with a Cronbach's alpha of 0.93 (Ahn et al., 2019). Responses were then recoded as minimal/mild anxiety (total score ≤9) and moderate/severe anxiety (total score ≥10).

Depression. Depression was assessed using the Patient Health Questionnaire-9 (Kroenke et al., 2001). Participants reported the frequency of symptoms, such as "little interest or pleasure in doing things," "feeling down, depressed, or hopeless," and "poor appetite or overeating" over the past 2 weeks, on a 4-point scale from 0 (*not at all*) to 3 (*nearly every day*). Total scores ranged from 0 to 27, with higher scores indicating more severe depressive symptoms. The scale, validated in Korean (Shin et al., 2020), showed high internal consistency ($\alpha = 0.86$) in this sample. Using a cut-off score of ≥10, responses were dichotomized into minimal/mild depression and moderate/moderately severe/severe depression.

Social Isolation. Social isolation was assessed using the Lubben Social Network Scale-6 (LSNS-6; Lubben et al., 2006) to identify social isolation from family and friends. The LSNS-6 includes six items: three on family ties and three on friend ties, evaluating the number of family/friends the respondent (a) sees or hears from at least monthly, (b) feels at ease with discussing private matters, and (c) feels close to asking for help. Each item is scored on a 6-point scale (0 = *none,* 5 = *nine or more*). Total scores for family and friend subscales range from 0 to 30. The Korean version, validated in studies with Korean American older adults (Hong et al., 2011), showed high internal consistency in this sample (family, $\alpha = 0.90$; friends, $\alpha = 0.89$). Isolation was identified using subscale scores <12 = *socially isolated* and ≥12 = *socially connected*.

Loneliness. To assess feelings of loneliness, we adapted the three-item UCLA Loneliness Scale (Hughes et al., 2004). Participants reported how frequently they experienced lack of companionship, felt left out, or felt isolated. Each item was rated on a 4-point scale ranging from 1 (*never*) to 4 (*always*), yielding total scores between 3 and 12, with higher scores indicating greater levels of loneliness (Hughes et al., 2004; Russell et al., 1978). The scale was translated into Korean and validated, showing a Cronbach's alpha of 0.86 (Kim, 1997). This variable was used as a continuous variable.

Covariates. Sociodemographic characteristics included age (categorized as 65 to 74, 75 to 82, and ≥85 years), gender (female, male), marital status (married, widowed, and other), educational level (less than a high school graduate, high school graduate, less than a college graduate, and college graduate or more), employment status (not employed, part-time/full-time), and whether financial needs were met by income (yes/no).

Statistical Analysis

We first conducted descriptive analyses of participant characteristics, reporting means, standard deviations for continuous variables, and percentages for categorical variables, using chi-square tests for comparisons. Next, logistic regression models estimated the association of sleep quality with physical, mental, or social health factors. Three models were examined: the first model with no covariates; the second model adding age and gender as covariates; and the third model further adjusting for marital status, educational level, employment, and income. Each health factor was analyzed individually rather than combined in a single model. We also tested gender as a potential effect modifier using models adjusted for all sociodemographic variables. When the effect modifiers were significant at $p < 0.1$, we conducted stratified analyses. All statistical analyses were computed using STATA, version 18.

RESULTS

Table 1 reports participants' characteristics. Of 314 participants, 159 (50.6%) had excellent/very good/good sleep quality, whereas 155 (49.4%) had fair/poor sleep quality. Group differences, assessed with *t* test and chi-square tests, were highly significant ($p < 0.0001$) for physical health rating, energy level, pain level,

TABLE 1

Participant Characteristics

Characteristic	Sleep Quality, *n* (%)			
	All (*N* = 134, 100%)	Excellent/ Very Good/Good (*n* = 159, 50.6%)	Fair/Poor (*n* = 155, 49.4%)	χ^2 (*t*)
Physical health rating				44.30***
Excellent/very good/good	163 (51.9)	112 (70.4)	51 (32.9)	
Fair/poor	151 (48.1)	47 (29.6)	104 (67.1)	
No. of chronic conditions				8.53*
0	34 (10.8)	22 (13.8)	12 (7.7)	
1 to 2	205 (65.3)	109 (68.6)	96 (61.9)	
≥3	75 (23.9)	28 (17.6)	47 (30.3)	
Energy level				47.74***
Excellent/very good	59 (18.8)	47 (29.6)	12 (7.7)	
Good	82 (26.1)	54 (34)	28 (18.1)	
Fair/poor	173 (55.1)	58 (36.5)	115 (74.2)	
Pain level				35.7***
None	37 (11.8)	31 (19.5)	6 (3.9)	
Mild/minor/moderate	213 (67.8)	113 (71.1)	100 (64.5)	
Strong/very strong	64 (20.4)	15 (9.4)	49 (31.6)	
Urinary incontinence				21.77***
Never	135 (43.3)	86 (54.4)	49 (31.8)	
Occasionally	145 (46.5)	65 (41.1)	80 (52)	
Frequently/always	32 (10.3)	7 (4.4)	25 (16.2)	
Mental health rating				46.11***
Excellent/very good/good	204 (65)	132 (83)		
Fair/poor	110 (35)	27 (17)	83 (53.6)	
Anxiety				7.24**
Minimal/mild	293 (93.9)	155 (97.5)	138 (90.2)	
Moderate/severe	19 (6.1)	4 (2.5)	15 (9.8)	
Depression				27.72***
Minimal/mild	254 (81.7)	147 (93)	107 (69.9)	
Moderate/moderately severe/severe	57 (18.3)	11 (7)	46 (30.1)	
Social isolation				0.42
Socially isolated	82 (26.3)	39 (24.7)	43 (27.9)	
Socially connected	230 (73.7)	119 (75.3)	111 (72.1)	
Loneliness, mean (*SD*)[a]	5 (1.8)	4.4 (1.5)	5.5 (1.9)	(−5.85)***

TABLE 1 (CONTINUED)

Participant Characteristics

Characteristic	All (*N* = 134, 100%)	Sleep Quality, *n* (%) Excellent/ Very Good/Good (*n* = 159, 50.6%)	Fair/Poor (*n* = 155, 49.4%)	χ^2 (*t*)
Age (years)				9.45**
65 to 74	76 (24.2)	47 (29.6)	29 (18.7)	
75 to 84	167 (53.2)	86 (54.1)	81 (52.3)	
≥85	71 (22.6)	26 (16.4)	45 (29)	
Gender				0.38
Female	226 (72)	112 (70.4)	114 (73.6)	
Male	88 (28)	47 (29.6)	41 (26.5)	
Marital status				2.28
Married	124 (39.5)	68 (42.8)	56 (36.1)	
Widowed	115 (36.6)	52 (32.7)	63 (40.7)	
Other	75 (23.9)	39 (24.5)	36 (23.2)	
Educational level				6.16
Less than high school	96 (31)	41 (26.3)	55 (35.7)	
High school graduate	101 (32.6)	50 (32.1)	51 (33.1)	
Some college	38 (12.3)	25 (16)	13 (8.4)	
College graduate or higher	75 (24.2)	40 (25.6)	35 (22.7)	
Employment				0.00
Not employed	305 (97.4)	154 (97.5)	151 (97.4)	
Part time/full time	8 (2.6)	4 (2.5)	4 (2.6)	
Financial need met by income				4.66*
Yes	207 (67.9)	114 (73.6)	93 (62)	
No	98 (32.1)	41 (26.5)	57 (38)	

[a] *Measured with the UCLA Loneliness Scale, where higher scores indicate more loneliness (range = 3 to 12).*
* p < *0.05;* ** p < *0.01;* *** p < *0.001.*

urinary incontinence, mental health rating, depression, and loneliness; significant for anxiety and age ($p < 0.01$); and significant for chronic conditions and financial needs ($p < 0.05$). No significant differences emerged for social isolation, gender, marital status, educational level, or employment status. Notably, a higher proportion of individuals with excellent/very good/good sleep quality had better physical health ratings (70.4% vs. 32.9%), excellent/very good energy levels (29.6% vs. 7.7%), and lower rates of frequent/always urinary incontinence (4.4% vs.16.2%), whereas those with fair/poor sleep quality reported fair/poor mental health (53.6% vs. 17%) and moderate/moderately severe/severe depression (30.1% vs. 7%).

Table 2 presents the odds ratios (ORs) and 95% confidence intervals (CIs) for logistic regression models to examine the association between physical, mental, or social health factors and sleep quality. In all models, fair/poor physical health rating, fair/poor energy level, mild to very strong pain levels, occasional to frequent urinary incontinence, fair/poor mental

TABLE 2

Logistic Regression Analyses: Health Conditions and Sleep Quality (*N* = 314)

	Fair/Poor Sleep Quality (ref: Excellent/Very Good/Good), OR [95% CI]		
Variable	**Model 1**	**Model 2**	**Model 3**
Physical health rating (ref: excellent/very good/good)			
Fair/poor	4.86 [3.01, 7.84]***	4.61 [2.83, 7.51]***	4.89 [2.90, 8.24]***
Chronic conditions (ref: no chronic condition)			
1 to 2	1.62 [0.76, 3.44]	1.74 [0.80, 3.77]	1.68 [0.74, 3.82]
≥3	3.08 [1.32, 7.16]**	3.25 [1.37, 7.73]**	2.71 [1.07, 6.82]*
Energy level (ref: excellent/very good)			
Good	2.03 [0.93, 4.44]	2.13 [0.96, 4.72]†	2.24 [0.98, 5.12]†
Fair/poor	7.77 [3.83, 15.77]***	8.02 [3.82, 16.83]***	7.92 [3.68, 17.06]***
Pain level (ref: no pain)			
Mild/minor/moderate pain	4.57 [1.83, 11.41]**	4.79 [1.89, 12.12]***	4.30 [1.67, 11.12]**
Strong/very strong pain	16.87 [5.92, 48.13]***	15.99 [5.48, 46.64]***	14.92 [4.93, 45.19]***
Urinary incontinence (ref: never)			
Occasionally	2.16 [1.34, 3.49]**	2.16 [1.32, 3.52]**	1.77 [1.05, 2.98]*
Frequently/always	6.27 [2.53, 15.55]***	5.85 [2.32, 14.75]***	5.13 [1.96, 13.42]***
Mental health rating (ref: excellent/very good/good)			
Fair/poor	5.64 [3.35, 9.49]***	5.42 [3.19, 9.20]***	5.82 [3.29, 10.31]***
Anxiety (ref: minimal/mild)			
Moderate/severe	4.21 [1.37, 12.99]*	4.47 [1.43, 13.96]**	4.71 [1.45, 15.24]**
Depression (ref: minimal/mild)			
Moderate/moderately severe/severe	5.75 [2.84, 11.61]***	5.65 [2.78, 11.52]***	5.11 [2.45, 10.62]***
Social Isolation (ref: socially connected)			
Socially isolated	1.18 [0.71, 1.96]	1.19 [0.71, 1.99]	1.04 [0.60, 1.81]
Loneliness[a]	1.50 [1.29, 1.75]***	1.52 [1.30, 1.77]***	1.49 [1.27, 1.75]***

Note. OR = odds ratio; CI = confidence interval. Model 1: exposure. Model 2: Model 1 + age, gender. Model 3: Model 2 + marital status, educational level, employment status, income.

[a] *Measured with the UCLA Loneliness Scale, where higher scores indicate more loneliness (score range = 3 to 12).*

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; † $p < 0.1$.

health rating, moderate/severe anxiety, moderate/severe depression, and loneliness were significantly associated with fair/poor sleep quality. In the multivariate-adjusted model (Model 3), individuals with fair/poor physical health ratings were 4.89 times more likely to report fair/poor sleep quality compared to those with excellent/very good/good physical health ratings (95% CI [2.90, 8.24]). Those with more than three chronic conditions were 2.71 times more likely to experience poor sleep quality than those without chronic conditions (95% CI [1.07, 6.82]).

In addition, individuals with fair/poor energy levels were 7.92 times

TABLE 3

Logistic Regression Analyses: Social Isolation and Sleep Quality, Stratified By Gender (*N* = 314)

	Fair/Poor Sleep Quality (ref: Excellent/Very Good/Good), OR [95% CI]		
Variable	**Model 1**	**Model 2**	**Model 3**
Social isolation (ref: socially connected)			
Female (*n* = 226)			
Socially isolated	0.80 [0.43, 1.49]	0.75 [0.40, 1.42]	0.58 [0.29, 1.16]
Male (*n* = 88)			
Socially isolated	2.83 [1.14, 7.04]*	3.11 [1.19, 8.13]*	3.32 [1.09, 10.15]*

Note. OR = odds ratio; CI = confidence interval. Model 1: exposure. Model 2: Model 1 + age. Model 3: Model 2 + marital status, educational level, employment status, income.

*$p < 0.05$.

more likely to report poor sleep quality compared to those with excellent/very good energy levels (95% CI [3.68, 17.06]). Severe pain increased the likelihood of poor sleep quality by 14.92 times compared to individuals who did not experience pain (95% CI [4.93, 45.19]). Frequent urinary incontinence was associated with a 5.13 times greater likelihood of poor sleep quality compared to those who never experienced this condition (95% CI [1.96, 13.42]). Individuals with fair/poor mental health ratings were 5.82 times more likely to report poor sleep quality compared to those with excellent/very good/good mental health ratings (95% CI [3.29, 10.31]). In addition, individuals experiencing moderate to severe anxiety were 4.71 times more likely to have poor sleep quality compared to those with minimal or mild anxiety (95% CI [1.45, 15.24]). Similarly, those with moderate to severe depression were 5.11 times more likely to experience poor sleep quality compared to individuals with minimal or mild depression (95% CI [2.45, 10.62]).

We also examined the potential moderating effect of gender on the association between social isolation and sleep quality. The *p* value for the interaction term was 0.0078. Results are shown in **Table 3**. In all models, socially isolated males were 2.8 to 3.3 times more likely to experience fair/poor sleep quality compared to socially connected males (all $p < 0.01$). We did not find any statistically significant association among females.

DISCUSSION

The current study addresses a significant gap in research on sleep quality among Korean American older adults in senior housing. Despite the rapidly growing Korean American population in the United States, factors associated with their sleep health remain underexplored. This research, the first of its kind, provides foundational knowledge and insights into this population's sleep-related needs to improve their overall well-being. Approximately one half (49.36%) of 314 participants reported fair/poor sleep quality, highlighting a significant issue. Prior research links poor sleep to physical disability, impaired mobility, frailty, and reduced functional capacity in older adults (Campanini et al., 2019). Moreover, sleep disturbances are significantly associated with an increased likelihood of multimorbidity, further compounding physical health challenges and reducing overall quality of life among Korean American older adults (Ryu et al., 2023; Zhou et al., 2023). These connections emphasize the need for targeted sleep interventions. Our analysis revealed significant associations among various health factors and sleep quality after adjusting for age, marital status, educational level, employment, and income.

Individuals with fair/poor physical health were approximately five times more likely to experience poor sleep quality than those in good physical health, aligning with findings that poor physical health adversely affects sleep quality (Hanson & Huecker, 2023). Sleep deprivation shares similar physiological features, such as elevated serum cortisol or decreased testosterone (Hanson & Huecker, 2023). Similarly, individuals with more than three chronic conditions were significantly more likely to report poor sleep quality, emphasizing the compounded impact of multiple health issues on sleep, consistent with other research showing that more chronic conditions are related to poor sleep quality (Zhou et al., 2023). Moreover, factors associated with multimorbidity—chronic pain, stress, and anxiety over

costs and treatments or medication side effects—can further disrupt sleep quality (Smith et al., 2022).

Energy level was also important, with those reporting fair/poor energy levels being approximately eight times more likely to experience poor sleep quality. This finding demonstrates the interdependence between daily vitality and sleep quality. Low energy levels often result from prolonged physical or mental fatigue that elevates stress and anxiety, triggering hyperarousal of the sympathetic nervous system and interfering with restful sleep (Drake et al., 2014).

Severe pain was another critical factor, with individuals experiencing strong/very strong pain being approximately 15 times more likely to report poor sleep quality This finding shows the profound impact of pain on sleep disturbances. Chronic pain often leads to insomnia and fragmented sleep due to hyperalgesia (i.e., increased sensitivity to pain), which perpetuates a cycle of poor sleep and increased pain (Haack et al., 2020).

Urinary incontinence also emerged as a significant factor, with individuals frequently/always experiencing this condition being more than five times more likely to have poor sleep quality. Nocturia—a common symptom of urinary incontinence—causes repeated nighttime awakenings that disrupt sleep cycles and prevent deep, restorative sleep, which leads to increased daytime fatigue (Nazaripanah et al., 2018). Effective management of urinary incontinence could play an essential role in improving sleep quality.

Mental health factors were also strongly associated with sleep quality. Individuals with fair or poor mental health ratings were approximately six times more likely to report poor sleep quality. Anxiety and depression were also significantly associated with sleep, with those experiencing moderate to severe anxiety and moderate to severe depression being much more likely to have poor sleep quality. These findings are congruent with existing literature that suggests depression and anxiety as negative contributors to sleep quality among individuals with insomnia (Ohayon & Roth, 2003). Possible biological mechanisms that mediate depressive symptoms and poor sleep outcomes include predisposition in circadian genes, hypothalamic-pituitary-adrenal axis hyperactivity, or monoaminergic neurotransmitter disruptions (Benca & Peterson, 2008). Dysfunction in the GABAergic, monoaminergic, and cholinergic mechanisms potentially mediates anxiety symptoms to poor sleep quality (Staner, 2003). Other research suggests sleep disturbances as a risk factor for depressive symptoms and anxiety (Corbo et al., 2023). The current study's findings emphasize the importance of integrated care that addresses physical and mental health to improve sleep outcomes.

Social isolation is linked to an increased risk of mental health issues, such as depression and anxiety (Newman-Norlund et al., 2022). Isolation leads to feelings of loneliness, which can exacerbate stress, cause emotional dysregulation, and increase vulnerability to psychological disorders—mental health issues, in turn, have a direct negative impact on sleep, contributing to conditions, such as insomnia (Hawkley & Cacioppo, 2010). Furthermore, social connectedness—such as supportive relationships with family and friends—and positive social interactions promote better sleep, whereas loneliness and isolation are associated with sleep disturbances and shorter sleep duration (Kent de Grey et al., 2018). To mitigate the negative effects of social isolation on sleep quality, interventions could focus on promoting community-based programs that encourage social engagement, such as support groups or recreational activities (Cudjoe et al., 2020). Moreover, the analysis of the moderating effect of gender on the association between social isolation and sleep quality yielded significant findings, particularly among males. Our study found that socially isolated males were consistently more likely to experience fair or poor sleep quality compared to their socially connected counterparts. This finding shows the protective effect of social connections, particularly for males, and suggests that fostering social ties could be beneficial in maintaining good sleep quality.

LIMITATIONS

The current study has several limitations. First, the cross-sectional design limits causal inference and risks reverse causation. Future longitudinal studies could track changes in health and sleep quality over time to clarify directionality. Second, the sample—Korean American older adults in Los Angeles senior housing—may not generalize to those in other regions or living arrangements. Expanding recruitment to diverse geographical areas could improve external validity. Third, sleep quality was assessed using a single self-reported question, which risks oversimplification. Single-item measures may lack the reliability and granularity of validated multi-item scales (e.g., Pittsburgh Sleep Quality Index), potentially obscuring nuanced relationships between variables. Consequently, inferences about sleep quality and its correlates must be interpreted with caution. Using more comprehensive and validated multi-item sleep scales in future studies can provide a more accurate picture of sleep quality.

IMPLICATIONS AND CONCLUSION

Findings from the current study have several future implications for research and practice to improve sleep quality among Korean American older adults in senior housing. First, the strong association among poor physical health, chronic conditions, pain, depression, anxiety, and sleep quality emphasizes the need for integrated health care approaches within senior housing environments that address physical and mental health with sleep. Furthermore, developing culturally tailored interventions that enhance

social connections within these senior housing communities—particularly for males—could mitigate the adverse effects of social isolation on sleep. These steps will be crucial in developing effective strategies to improve sleep health and overall well-being among Korean American older adults in senior housing.

REFERENCES

Ahn, J.-K., Kim, Y., & Choi, K.-H. (2019). The psychometric properties and clinical utility of the Korean version of GAD-7 and GAD-2. *Frontiers in Psychiatry, 10,* 127. https://doi.org/10.3389/fpsyt.2019.00127 PMID:30936840

Azizi-Zeinalhajlou, A., Mirghafourvand, M., Nadrian, H., Samei Sis, S., & Matlabi, H. (2022). The contribution of social isolation and loneliness to sleep disturbances among older adults: A systematic review. *Sleep and Biological Rhythms, 20*(2), 153–163. https://doi.org/10.1007/s41105-022-00380-x PMID:38469248

Benca, R. M., & Peterson, M. J. (2008). Insomnia and depression. *Sleep Medicine, 9*(Suppl. 1), S3–S9. https://doi.org/10.1016/S1389-9457(08)70010-8 PMID:18929317

Billings, M. E., Cohen, R. T., Baldwin, C. M., Johnson, D. A., Palen, B. N., Parthasarathy, S., Patel, S. R., Russell, M., Tapia, I. E., Williamson, A. A., & Sharma, S. (2021). Disparities in sleep health and potential intervention models: A focused review. *Chest, 159*(3), 1232–1240. https://doi.org/10.1016/j.chest.2020.09.249 PMID:33007324

Campanini, M. Z., Mesas, A. E., Carnicero-Carreño, J. A., Rodríguez-Artalejo, F., & Lopez-Garcia, E. (2019). Duration and quality of sleep and risk of physical function impairment and disability in older adults: Results from the ENRICA and ELSA cohorts. *Aging and Disease, 10*(3), 557–569. https://doi.org/10.14336/AD.2018.0611 PMID:31165000

Corbo, I., Forte, G., Favieri, F., & Casagrande, M. (2023). Poor sleep quality in aging: The association with mental health. *International Journal of Environmental Research and Public Health, 20*(3), 1661. https://doi.org/10.3390/ijerph20031661 PMID:36767029

Cudjoe, T. K., Roth, D. L., Szanton, S. L., Wolff, J. L., Boyd, C. M., & Thorpe, R. J., Jr. (2020). The epidemiology of social isolation: National Health and Aging Trends Study. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 75*(1), 107-113.

Decker, A. N., Fischer, A. R., & Gunn, H. E. (2022). Socio-ecological context of sleep: Gender differences and couples' relationships as exemplars. *Current Psychiatry Reports, 24*(12), 831–840. https://doi.org/10.1007/s11920-022-01393-6 PMID:36401678

Drake, C. L., Pillai, V., & Roth, T. (2014). Stress and sleep reactivity: A prospective investigation of the stress-diathesis model of insomnia. *Sleep, 37*(8), 1295–1304. https://doi.org/10.5665/sleep.3916 PMID:25083009

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*(3), 189–198. https://doi.org/10.1016/0022-3956(75)90026-6 PMID:1202204

Gordon, N. P., Yao, J. H., Brickner, L. A., & Lo, J. C. (2022). Prevalence of sleep-related problems and risks in a community-dwelling older adult population: A cross-sectional survey-based study. *BMC Public Health, 22*(1), 2045. https://doi.org/10.1186/s12889-022-14443-8 PMID:36348296

Gothe, N. P., Ehlers, D. K., Salerno, E. A., Fanning, J., Kramer, A. F., & McAuley, E. (2020). Physical activity, sleep and quality of life in older adults: Influence of physical, mental and social well-being. *Behavioral Sleep Medicine, 18*(6), 797–808. https://doi.org/10.1080/15402002.2019.1690493 PMID:31713442

Grandner, M. A., Williams, N. J., Knutson, K. L., Roberts, D., & Jean-Louis, G. (2016). Sleep disparity, race/ethnicity, and socioeconomic position. *Sleep Medicine, 18,* 7–18. https://doi.org/10.1016/j.sleep.2015.01.020

Haack, M., Simpson, N., Sethna, N., Kaur, S., & Mullington, J. (2020). Sleep deficiency and chronic pain: Potential underlying mechanisms and clinical implications. *Neuropsychopharmacology, 45*(1), 205–216. https://doi.org/10.1038/s41386-019-0439-z PMID:31207606

Hanson, J. A., & Huecker, M. R. (2024). Sleep deprivation. In *StatPearls* [internet]. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK547676/

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine, 40*(2), 218–227. https://doi.org/10.1007/s12160-010-9210-8 PMID:20652462

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., Herman, J., Katz, E. S., Kheirandish-Gozal, L., Neubauer, D. N., O'Donnell, A. E., Ohayon, M., Peever, J., Rawding, R., Sachdeva, R. C., Setters, B., Vitiello, M. V., Ware, J. C., & Adams Hillard, P. J. (2015). National Sleep Foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health, 1*(1), 40–43. https://doi.org/10.1016/j.sleh.2014.12.010 PMID:29073412

Hofmeister, D., Schulte, T., & Hinz, A. (2020). Sleep problems in cancer patients: A comparison between the Jenkins Sleep Scale and the single-item sleep scale of the EORTC QLQ-C30. *Sleep Medicine, 71,* 59–65. https://doi.org/10.1016/j.sleep.2019.12.033 PMID:32502851

Hong, M., Casado, B. L., & Harrington, D. (2011). Validation of Korean versions of the Lubben Social Network Scales in Korean Americans. *Clinical Gerontologist, 34*(4), 319–334. https://doi.org/10.1080/07317115.2011.572534

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655–672. https://doi.org/10.1177/0164027504268574 PMID:18504506

Kent de Grey, R. G., Uchino, B. N., Trettevik, R., Cronan, S., & Hogan, J. N. (2018). Social support and sleep: A meta-analysis. *Health Psychology, 37*(8), 787–798. https://doi.org/10.1037/hea0000628 PMID:29809022

Kim, O. S. (1997). Korean version of the revised UCLA Loneliness Scale: Reliability and validity test. *Journal of Korean Academy of Nursing, 27*(4), 871–879.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x PMID:11556941

Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., von Renteln Kruse, W., Beck, J. C., & Stuck, A. E. (2006). Performance of an abbreviated version of the Lubben Social Network Scale among three European community-dwelling older adult populations. *The Gerontologist, 46*(4), 503–513. https://doi.org/10.1093/geront/46.4.503 PMID:16921004

Lucey, B. P., McCullough, A., Landsness, E. C., Toedebusch, C. D., McLeland, J. S., Zaza, A. M., Fagan, A. M., McCue, L., Xiong, C., Morris, J. C., Benzinger, T. L. S., & Holtzman, D. M. (2019). Reduced non-rapid eye movement sleep is associated with tau pathology in early Alzheimer's disease. *Science Translational Medicine, 11*(474), eaau6550. https://doi.org/10.1126/scitranslmed.aau6550 PMID:30626715

Mander, B. A., Winer, J. R., & Walker, M. P. (2017). Sleep and human aging. *Neuron, 94*(1), 19–36. https://doi.org/10.1016/j.neuron.2017.02.004 PMID:28384471

Nazaripanah, N. S., Momtaz, Y. A., Mokhtari, F., & Sahaf, R. (2018). Urinary incontinence and sleep complaints in community dwelling older adults. *Sleep Science, 11*(2), 106–111. https://doi.org/10.5935/1984-0063.20180020 PMID:30083298

Newman-Norlund, R. D., Newman-Norlund, S. E., Sayers, S., McLain, A. C., Riccardi, N., & Fridriksson, J. (2022). Effects of social isolation on quality of life in elderly adults.

PLoS One, 17(11), e0276590. https://doi.org/10.1371/journal.pone.0276590 PMID:36327259

Ohayon, M. M., & Roth, T. (2003). Place of chronic insomnia in the course of depressive and anxiety disorders. *Journal of Psychiatric Research, 37*(1), 9–15. https://doi.org/10.1016/S0022-3956(02)00052-3 PMID:12482465

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment, 42*(3), 290–294. https://doi.org/10.1207/s15327752jpa4203_11 PMID:660402

Ryu, S., Morey, B. N., Lee, G. E., Kawachi, I., Redline, S., & Lee, S. (2023). The cross-sectional association of sleep disturbance and sleep apnea with complex multimorbidity among Chinese and Korean Americans. *American Journal of Epidemiology, 192*(3), 420–429. https://doi.org/10.1093/aje/kwac211 PMID:36516987

Shin, C., Ko, Y. H., An, H., Yoon, H. K., & Han, C. (2020). Normative data and psychometric properties of the Patient Health Questionnaire-9 in a nationally representative Korean population. *BMC Psychiatry, 20,* 194. https://doi.org/10.1186/s12888-020-02613-0 PMID:32354339

Smith, L., Shin, J. I., Jacob, L., Schuch, F., Oh, H., Tully, M. A., López Sánchez, G. F., Veronese, N., Soysal, P., Yang, L., Butler, L., Barnett, Y., & Koyanagi, A. (2022). Association between physical multimorbidity and sleep problems in 46 low- and middle-income countries. *Maturitas, 160,* 23–31. https://doi.org/10.1016/j.maturitas.2022.01.007 PMID:35550705

Smith, M. T., & Haythornthwaite, J. A. (2004). How do sleep disturbance and chronic pain inter-relate? Insights from the longitudinal and cognitive-behavioral clinical trials literature. *Sleep Medicine Reviews, 8*(2), 119–132. https://doi.org/10.1016/S1087-0792(03)00044-3 PMID:15033151

Song, Y., Ryan, G. W., Lee, D., Kim, H., Martin, J. L., Kramer, B. J., Hays, R. D., & Choi, S. E. (2022). Experiences of sleep problems among older Korean immigrants. *Research in Gerontological Nursing, 15*(4), 193–202. https://doi.org/10.3928/19404921-20220518-01 PMID:35609258

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092 PMID:16717171

Staner, L. (2003). Sleep and anxiety disorders. *Dialogues in Clinical Neuroscience, 5*(3), 249–258. https://doi.org/10.31887/DCNS.2003.5.3/lstaner PMID:22033804

Tombaugh, T. N., & McIntyre, N. J. (1992). The Mini-Mental State Examination: A comprehensive review. *Journal of the American Geriatrics Society, 40*(9), 922–935. https://doi.org/10.1111/j.1532-5415.1992.tb01992.x PMID:1512391

U.S. Census Bureau. (2023). *Asian American, Native Hawaiian and Pacific Islander Heritage Month: May 2023.* https://www.census.gov/newsroom/facts-for-features/2023/asian-american-pacific-islander.html#:~:text=The%20estimated%20number%20of%20people,and%20Japanese%20(1.6%20million)

Zhou, Y., Jin, Y., Zhu, Y., Fang, W., Dai, X., Lim, C., Mishra, S. R., Song, P., & Xu, X. (2023). Sleep problems associate with multimorbidity: A systematic review and meta-analysis. *Public Health Reviews, 44,* 1605469. https://doi.org/10.3389/phrs.2023.1605469 PMID:37383367