



Original Article

Gender-specific Correlations of Insomnia and Attitudes toward Treatment among Community-dwelling Elderly in Northern Taiwan



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ARTICLE INFO

Article history:

Received 14 February 2017

Received in revised form

31 May 2017

Accepted 17 July 2017

Available online 1 August 2017

Keywords:

elderly,
gender,
insomnia,
correlations,
attitudes toward treatment

SUMMARY

Background: This is the first study to examine gender-specific correlations and attitudes toward treatment among community-dwelling elderly individuals with insomnia in northern Taiwan.

Methods: A cross-sectional survey was conducted among 1358 adults aged ≥ 65 years who underwent a senior citizen health examination between March and November 2009 at a medical center.

Results: The overall prevalence of insomnia was 41.4%, with a higher rate in women (63.3%) than in men (36.7%). Difficulty falling asleep was the most commonly reported symptom (61.7%). About 60% of the elderly individuals had insomnia for longer than 1 year. In women, gender was an independent correlation. Higher scores on the 5-item Brief Symptom Rating Scale were associated with insomnia in both genders (odds ratio [OR] = 1.41–1.44, 95% confidence interval [CI]: 1.31–1.57). The use of medication for a chronic illness increased the correlation of insomnia in women (OR = 1.9, 95% CI: 1.39–2.59), and living with family decreased the correlation of insomnia in men (OR = 0.42, 95% CI: 0.21–0.82). Further, 47.9% of individuals reported using insomnia medication. Of those, 49.3% and 82.3% with untreated insomnia desired complementary/alternative medicine and sleep hygiene as treatments, respectively.

Conclusion: Early intervention to halt the progress of sleep disturbance and avoid unnecessary medication use are important. We identified a need for improved attitudes toward sleep hygiene and treatment among elderly Taiwanese individuals.

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1. Introduction

Insomnia prevalence rates as high as 50–70% have been reported among individuals aged ≥ 65 years.¹ National Institute on Aging (NIA) survey in the US found that 42% of elderly patients reported difficulties with both sleep initiation and maintenance.² Several psychiatric diseases (anxiety or depression) have altered the pattern of sleep.³ Elderly individuals with insomnia frequently complain of fatigue, mood changes, difficulty in concentrating, and impaired daytime functioning.⁴ The early detection and treatment of insomnia in elderly individuals is therefore very important.

The previous finding that most insomnia individuals did not seek medical treatment despite the awareness that insomnia can lead to further health problems.⁵ Over-the-counter therapies are popular among the elderly, who frequently choose to self-medicate

with drugs or other substances that they believe can alleviate their insomnia.⁶ Early intervention may halt their progress of sleep disturbance and avoid unnecessary medication use.⁶

Nowadays, non-pharmaceutical strategies such as sleep hygiene education, cognitive therapy, multicomponent therapy, and herbal treatment with complementary/alternative medicine (CAM) (such as melatonin, valerian) have proven to be successful in the treatment of sleep disturbance in elderly populations.^{7,8} Additionally, several other modalities such as Tai Chi, acupuncture, acupressure, yoga, and meditation have improved sleep parameters in a limited number of early trials.⁸

Insomnia in the elderly has been extensively studied in Western nations.⁹ One study similar to ours was previously conducted in Taiwan, and focused on 1-month insomnia among the urban elderly.¹⁰ The present study aimed to determine the prevalence of chronic insomnia and identify the correlations for each gender group. Another point of focus was the views and attitudes of these elderly individuals toward insomnia and the treatment methods they chose to adopt. We believe the results of this study should be

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taken seriously by healthcare professionals, and that common sleep complaints and sleep habits should be investigated when assessing elderly patients. Effective detection and treatment of insomnia may improve the quality of life of elderly population.

2. Methods

2.1. Study population

Data were collected using structured, face-to-face interviews in an effort to avoid errors common to self-report questionnaires. After excluding 41 individuals whose interview questionnaires were incomplete, data from 1358 individuals were included in our data analysis (recovery rate: 97.1%). All participants provided written informed consent. Our study was approved by the Institutional Review Board of our hospital and was issued a research project number (09MMHIS011).

2.2. Questionnaire

2.2.1. Insomnia syndrome

The Chinese version of the Athens Insomnia Scale (CAIS) is a self-report instrument designed to screen for insomnia symptoms. One of the specified diagnostic criteria for primary insomnia is that symptoms of insomnia occur at a frequency of ≥ 3 times per week in the past month. The CAIS-5 uses items 1–5 of the AIS (nighttime symptoms) to screen for and diagnose insomnia in clinical practice, and it has satisfactory reliability and validity.¹¹

2.2.2. Insomnia symptoms and duration

The relevant insomnia symptoms occurring ≥ 3 times per week included difficulty falling asleep, difficulty maintaining sleep, non-refreshing sleep, and early morning awakenings. Insomnia duration was divided into 5 categories: 1 month, more than 1 month to 1/2 year, more than 1/2 year to 1 year, more than 1 year to 3 years, and more than 3 years.¹¹

2.2.3. Brief Symptom Rating Scale

Mental health was screened using the Brief Symptom Rating Scale (BSRS-5). This self-report questionnaire asks respondents to report whether they have felt tense, blue, irritated, inferior, or had trouble falling asleep in the past week. Responses are rated on a 5-point scale from 0 (“not at all”) to 4 (“extremely”).¹² The BSRS-5 has a 76.3% rate of accurate classification when a score of ≥ 6 is used as the cut-off for psychiatric cases.¹² The BSRS-4 was used in this study, as the confounding factor “trouble falling asleep” was deleted from the questionnaire.

2.2.4. Definition of taking medication for insomnia

Participants who had ever used oral medications for insomnia, including hypnotics, melatonin, anti-depressants, anti-anxiety medications, antihistamines, relaxants, herbs, health supplements, and other kinds of substances meant to aid sleep onset during periods of insomnia were categorized as having taken medications for insomnia.

2.2.5. Complementary/alternative medicine (CAM)

Based on the definition of CAM provided by the National Center for Complementary and Alternative Medicine (NCCAM),¹³ our questionnaire focused on mind–body intervention therapies such as relaxation therapy, meditation, biofeedback, hypnosis, manipulation, massage, Tai Chi, acupuncture, acupressure, yoga, and chiropractic therapy.

2.2.6. Sleep hygiene

Behavioral therapy has been commonly used for insomnia in previous studies¹⁴ (Table 1).

2.2.7. Covariates

Detailed demographic information, including gender, education level, type of household, and detailed histories of medication use for chronic illnesses were collected during the interviews. Education levels were classified into the following 5 categories: illiterate, elementary school, junior high school, senior high school, and college or higher. Types of household were categorized as either “living alone” or “living with family.”

In addition, physical activity was assessed by the Lipids Research Clinics Questionnaire and lifestyles were categorized as sedentary or non-sedentary.¹⁵ Lifestyle characteristics, including smoking history and alcohol consumption, were measured using study-specific questionnaires.

3. Results

3.1. Demographic data

As can be seen from the characteristics of the participants shown in Table 2, women outnumbered men in this study (55.7% vs. 44.3%). Additionally, the average age of the male respondents was higher than that of the female respondents (74.69 years vs. 73.29 years, $p < 0.01$). There was no difference in BMI between the two groups. With regard to type of household, women were more likely than men to be living alone (10.7% vs. 6.3%, $p = 0.01$). Men were more likely to be undergoing medical treatment for a chronic condition and also tended to have higher education levels than women. Women scored higher on the BSRS-5 than did men (2.5 vs. 1.83, $p < 0.001$) and the percentage of BSRS-5 scores ≥ 6 was higher for women than men (13.1% vs. 8.7%). The average score on the BSRS-4 was also higher in women (2.12 \pm 0.12) than in men (1.45 \pm 0.33) ($p < 0.01$).

3.2. Prevalence of insomnia by gender

As shown in Table 3, 41.4% ($n = 562$) of the 1358 participants met the criteria for insomnia, including 206 men (36.7%) and 356 women (63.3%). The results indicate that the majority of the

Table 1
Sleep-hygiene measures.¹⁴

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- Avoid and minimize use of caffeine, cigarettes, stimulants, alcohol, and other medications
 - If medically able, increase activity level in the afternoon or early evening (not close to bedtime) by walking or exercising outdoors
 - Increase exposure to natural light and bright light during day and early evening
 - Avoid napping, particularly after 2:00 PM; limit naps to 1 nap of less than 30 min
 - Check the effect of medications on sleep
 - Go to bed only when sleepy
 - Maintain comfortable temperature in bedroom
 - Minimize light and noise exposure as much as possible
 - Eat a light snack if hungry
 - Avoid heavy meals at bedtime
 - Limit liquids in the evening
 - Keep a regular schedule
 - Rest and retire at the same time each day
 - Eat and exercise on a regular schedule
 - Stress-management measures:
 - Tolerance of occasional sleeplessness
 - Discuss worries and stressful events enough time before bedtime
 - Use relaxation techniques
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Table 2
Characteristics of the participants by gender ($n = 1358$).

Variable	Men (601, 44.3%)	Women (757, 55.7%)	<i>p</i> Value
	<i>n</i> (%)	<i>n</i> (%)	
Age (mean \pm SD)	74.69 \pm 5.5	73.29 \pm 5.6	<0.01 ^a
Age group (y)			<0.01
65–69	111 (18.5)	212 (28.0)	
70–74	205 (34.1)	265 (35.0)	
75–79	164 (27.3)	171 (22.6)	
≥ 80	121 (20.1)	109 (14.4)	
BMI (mean \pm SD)	24.45 \pm 3.1	24.62 \pm 3.5	0.640 ^a
Smoking status	55 (9.2)	5 (0.7)	<0.01
Alcohol consumption	129 (21.5)	16 (2.1)	<0.01
Sedentary lifestyle	50 (8.4)	91 (12.0)	0.038
Living condition			0.010 ^b
Single	38 (6.3)	82 (10.7)	
With family	563 (93.7)	675 (89.3)	
Receipt of medication for chronic disease	427 (71.0)	498 (65.9)	0.048
Education level			<0.01
Illiterate	14 (2.3)	58 (7.6)	
Elementary	122 (20.3)	288 (38.1)	
Junior high school	75 (12.4)	159 (21.0)	
Senior high school	175 (29.1)	171 (22.6)	
\geq College	215 (35.9)	81 (10.7)	
BSRS-5 score ^c (mean \pm SD)	1.83 \pm 0.8	2.50 \pm 0.3	<0.01 ^a
BSRS-5 group			0.028
Normal (0–5)	549 (91.3)	658 (86.9)	
Mild (6–9)	31 (5.2)	70 (9.3)	
Moderate (10–14)	18 (3.0)	22 (2.9)	
Severe (≥ 15)	3 (0.5)	7 (0.9)	

Chi-square test was used to compare the male and female groups. BSRS-5: 5-item Brief Symptom Rating Scale.

^a Student's *t*-test was used to compare the male and female groups.

^b Fisher's exact test was used to compare the male and female groups.

^c BSRS-4: 4-item Brief Symptom Rating Scale: men, 1.45 \pm 0.33; women, 2.12 \pm 0.12 ($p < 0.01$).

women had insomnia; difficulty falling asleep was the most common insomnia symptom (61.7%), followed by difficulty maintaining sleep (29.3%) and then early morning awakening (23.3%). Most participants with insomnia belonged to the chronic insomnia group, having experienced symptoms for more than 1 year (60%).

3.3. Attitude and beliefs toward treatment by gender

Approximately half of the participants with insomnia ($n = 293$, 52.1%) had not used sleep medication, while 269 participants (47.9%) had used such medications (Table 4). Most insomnia-afflicted participants using medication were taking only one kind

of medication (88.5%) and the medications they used were mostly obtained from pharmacies (62.5%).

The most common treatment method chosen by non-medicated participants with insomnia was sleep hygiene ($n = 241$, 82.3%), the prevalence of which was higher in men than in women. The second most common method was CAM, for which the prevalence was higher in women than in men (49.7% vs. 48.5%). The prevalence of participants who chose to do nothing was higher among men than among women (25.1% vs. 20.2%).

The most common reason given by those with insomnia who had not used medications was that they feared addiction (51.9%), followed by worried about medications being harmful to health (35.2%) and then unwillingness to get treatment with medication (13.3%).

3.4. Correlations for insomnia by gender

As shown in Table 5, the correlations for insomnia were found to differ between men and women. For men, living with family decreased the correlation of insomnia (odds ratio [OR] = 0.42). For women, taking medication for a chronic illness increased the correlation of insomnia (OR = 1.9). For both genders, higher BSRS-5 scores were found to increase the correlation of insomnia (men: OR = 1.44, women: OR = 1.41).

4. Discussion

This is the first study to focus on gender differences in views and attitudes concerning treatment of insomnia in this population. Out of the 1358 participants, 41.4% met the criteria for insomnia, with women more likely to be afflicted than men. In this study, we found a high prevalence of insomnia lasting more than 1 year (60%), while 1-month insomnia was less prevalent (15.7%). These results can be compared to those of prior studies that used different definitions of insomnia. Some of these studies reported lower prevalence rates ranging from 12% to 15.8%,¹⁶ while others reported somewhat higher rates (29.0–43.2%).¹⁷ We attributed the high prevalence rate of insomnia found in the present study to two factors. First, we use a broader definition, which required only one insomnia symptom. Second, more than half of participants (52.1%) choosing non-medication method have contributed to high insomnia rate.

Many studies have found that women have a greater correlation of developing insomnia than men, even after controlling for various correlations,¹⁸ and our findings are consistent with the results of these previous studies.¹⁸ Our study found that the prevalence of initial sleep disturbance was higher than that of sleep disturbance occurring later in the night, which was consistent with previous

Table 3
Characteristics of insomnia according to insomnia syndrome, symptoms, and duration by gender.

Variable	Total (1358)	Men (601, 44.3%)	Women (757, 55.7%)	<i>p</i> Value
Insomnia syndrome				
No	796 (58.6)	395 (65.7)	401 (53.0)	<0.01
Yes (continue Q _{A, B})	562 (41.4)	206 (34.3)	356 (47.0)	
A. Insomnia symptom (indirect election)				
Difficulty falling asleep	347 (61.7)	109 (52.9)	238 (66.9)	
Difficulty maintaining sleep	221 (39.3)	77 (37.4)	144 (40.4)	
Non-refreshing sleep	59 (0.1)	21 (10.2)	38 (10.7)	
Early morning awakening	131 (23.3)	63 (30.6)	68 (19.1)	
B. Insomnia duration				0.042
1 month	88 (15.7)	40 (19.4)	48 (13.5)	
>1 month to 1/2 year	58 (10.3)	26 (12.6)	32 (9.0)	
>1/2 year to 1 year	78 (13.9)	26 (12.6)	52 (14.6)	
>1 year to 3 years	119 (21.4)	46 (22.1)	73 (20.6)	
>3 years	219 (39.0)	68 (33.3)	151 (42.3)	

Chi-square test was used to compare the male and female groups.

Table 4
Attitudes and beliefs toward insomnia by gender.

Variable	Total (562)	Men (206, 36.7%)	Women (356, 63.3%)	p Value
<i>Strategies to cope with insomnia</i>				0.885
Taking medication for help (<i>continue Q1</i>)	269 (47.9)	86 (41.9)	183 (51.1)	
Choosing other methods (<i>continue Q2, indirect election</i>)	293 (52.1)	120 (58.1)	173 (48.9)	
<i>Q1 Sample size</i>	269 (47.9)	86 (41.9)	183 (51.1)	
a. Classification of medication				0.008
1	238 (88.5)	70 (81.5)	168 (91.6)	
2	21 (7.8)	11 (12.3)	10 (5.6)	
≥3	10 (3.7)	5 (6.2)	5 (2.8)	
b. Source of medication				0.035
From physicians	84 (31.2)	34 (40.0)	50 (27.3)	
From pharmacies	168 (62.5)	52 (60.0)	116 (63.6)	
From relatives	17 (6.3)	0 (0.0)	17 (9.1)	
<i>Q2 Sample size</i>	293 (52.1)	120 (58.1)	173 (48.9)	
a. Classification of methods				
Complementary/alternative medicine	144 (49.3)	58 (48.5)	86 (49.7)	
Sleep hygiene	241 (82.3)	100 (83.4)	141 (81.5)	
Do nothing	65 (22.3)	30 (25.1)	35 (20.2)	
b. Reasons for not employing medication				
Worried about harm to health	103 (35.2)	35 (29.7)	68 (39.3)	
Fear of becoming addicted	152 (51.9)	59 (50.0)	93 (53.8)	
Physicians or relatives do not recommend	13 (4.4)	5 (4.2)	8 (4.6)	
Medications ineffective	5 (1.7)	0 (0.0)	5 (2.9)	
Unwillingness to get medication treatment	39 (13.3)	19 (16.1)	20 (11.6)	

Chi-square test was used to compare the male and female group.

studies.¹⁹ Our study revealed a strong relationship between household type and insomnia among men. Living alone has a substantial influence on sleep-wake patterns, these factors may also increase the correlation of insomnia in older adults.²⁰ The present study showed this to be especially evident in male populations.

Previous study showed that a linear dose-dependent relationship between the number of chronic conditions and sleep problems was observed in all countries.²¹ Compared to no chronic conditions, the OR (95%CI) for 1, 2, 3, and ≥4 chronic conditions was 1.41 (1.09–1.82), 2.55 (1.99–3.27), 3.22 (2.52–4.11), and 7.62 (5.88–9.87) respectively in the overall sample.²¹ The present study confirmed these results, as the use of medication for chronic illness was shown to indicate an increased correlation of insomnia.

One prospective analyses, logistic regression analyses demonstrated that anxiety and depression at baseline [odds ratio (OR) = 4.27 (8% of variance) and OR = 2.28 (2% of variance),

respectively] were related to new cases of insomnia on follow-up.³ Insomnia at baseline was related to new episodes of high anxiety and high depression on follow-up [OR = 2.30 (2% of variance) and OR = 3.51 (4% of variance), respectively].³ Evidence suggests that there is a bidirectional relationship between, on one hand, anxiety and depression and, on the other hand, insomnia. Our results showed that mild, moderate, and severe mental symptoms were more frequent in individuals with insomnia than in unaffected individuals, and the effect was observed among both genders.

In one Latin American survey, only 31% of those with insomnia reported seeking medical help, and up to 74.2% considered their disorder to be mild and were not very concerned about it.⁵ In this study, the elderly patients with insomnia chose different strategies to cope with their sleep disturbance, and the most common method was behavioral change (sleep hygiene) (44%). In our study, about half of the elderly participants had chosen to treat their insomnia using medication, while the other half had chosen not to.

Table 5
Odds ratios of variables according to the non-insomnia and insomnia groups by gender through multivariable logistic regression.

Variable	Men (601, 44.3%)			Women (757, 55.7%)		
	OR	95% CI	p Value	OR	95% CI	p Value
Gender (ref.: male)				1.70	1.36–2.12	<0.01
Age (continue)	0.99	0.96–1.03	0.779	0.97	0.94–0.99	0.027
Age (ref.: 65–69 y)						
70–74 y	1.33	0.82–2.18	0.249	0.90	0.63–1.29	0.566
75–79 y	1.10	0.66–1.83	0.728	0.83	0.55–1.24	0.356
≥80 y	0.99	0.57–1.73	0.984	0.75	0.45–1.14	0.421
BMI (continue)	1.02	0.97–1.08	0.388	0.96	0.93–1.01	0.128
Smoking status (ref.: never)	0.84	0.46–1.53	0.575	0.28	0.03–2.51	0.255
Alcohol consumption (ref.: 0–3 drinks per week)	0.98	0.66–1.49	0.952	1.46	0.54–3.96	0.458
Sedentary lifestyle (ref.: no)	0.62	0.34–1.13	0.119	0.88	0.56–1.38	0.566
Living condition (ref.: single)	0.42	0.21–0.82	0.011	0.63	0.39–1.01	0.052
Receipt medication for chronic disease (ref.: no)	1.44	0.98–2.11	0.063	1.90	1.39–2.59	<0.001
Education level (ref.: illiterate)						
Elementary	1.14	0.36–3.62	0.820	1.06	0.59–1.88	0.845
Junior high school	0.92	0.28–3.03	0.889	1.26	0.68–2.32	0.463
Senior high school	0.91	0.29–2.82	0.874	1.45	0.73–2.87	0.292
≥College	0.85	0.27–2.67	0.786	1.57	0.85–2.87	0.147
BSRS-5 score ^a (continue)	1.44	1.32–1.57	<0.001	1.41	1.31–1.52	<0.01

Comparison between non-insomnia and insomnia syndrome groups.

^a BSRS-4 score: men, 1.41 (1.28–1.54, *p* < 0.01); women, 1.40 (1.29–1.51, *p* < 0.01).

Previous studies have also reported that women have a higher chance of using all types of CAM when compared with men,²² and that CAM is commonly used for insomnia treatment in patients over the age of 65.²³

The most frequently reported reason for not employing medication was fear of addiction (67%), and the least frequently reported reason was unwillingness to get medication (16%).⁵ Our finding was consistent with previous studies.⁵ Previous studies have reported adverse effects of sleep medications in geriatric patients.^{6,10} Our results showed that many of the participants were also worried about becoming addicted to medications or believed that medications are harmful to health, which is consistent with previous studies.^{5,6,10} Our primary-level medical care and healthcare institutions should offer better educational guidance to our elderly population concerning treatments for insomnia, such as sleep hygiene (Table 1).

5. Conclusion

We wanted to find out whether the influence of specific correlations could be identified in the evaluated elderly population, since issues, such as living status, chronic diseases condition, and emotional status warrant early intervention in order to halt the progress of sleep disturbance. Try to educate the elderly population about sleep hygiene and CAM, and avoid unnecessary medication use.

Conflict of interest

None.

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