

# Prevalence of Insomnia and Its Related Factors in Korean Women

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**Purpose:** The purposes of this study were to investigate the prevalence of insomnia and to compare sleep patterns, demographic characteristics, and obstacles for sleep between women with and without insomnia. **Methods:** This was a descriptive study. Study participants were 1,679 Korean women aged over 20 years. Information on symptoms of insomnia, sleep patterns, and related factors was assessed by questionnaire. Symptoms of insomnia included difficulties in initiating and maintaining sleep and early morning awakening. **Results:** This study found that 32.0% of the study participants had insomnia, subjects with insomnia had bad sleep patterns compared to comparison group, lower educational level and menopause were closely related to insomnia, and noise, temperature, lighting, presence of bed partner, intake of caffeine, frequent urination, and pain or itching were associated with insomnia. **Conclusion:** This study suggests that insomnia is prevalent in women and closely associated with education level and menopausal status.

**Key Words :** Prevalence, Insomnia, Women

## INTRODUCTION

### Backgrounds

Sleep has been defined as a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment(Carskadon & Dement, 2000). Disturbed sleep, which is commonly referred to as insomnia(Buysse et al., 1994; Wesleben, 1982), is considered to be an important health issue, which is frequently encountered even in the general adult population and may result in deleterious physical, psychological, and socioeconomic consequences within the general population(Ohayon & Smirne, 2002; Sateia,

Doghramji, Hauri, & Morin, 2000).

A number of epidemiological studies that have been published over the past decades indicated that the prevalence of insomnia in both Asian and Western countries ranged between 10.0 and 42.0%(Kim, Uchiyama, Okawa, Liu, & Ryuji, 2000; Morin, LeBlace, Daley, & Gregoire, 2006; Ohayon & Hong, 2002; Ohayon & Smirne, 2002; Owens & Matthews, 1998). In a study conducted with Koreans aged 15 years or older, the prevalence of insomnia was also reported to be 17.0%(Ohayon & Hong, 2002), including difficulty in initiating sleep(Difficulty in Initiating Sleep: DIS, 4.0%), difficulty in maintaining sleep (Difficulty in Maintaining Sleep: DMS, 11.5%), early morning awak-

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ening(Early morning Awakening: EMA, 1.8%), and nonrestorative sleep(4.7 %). In another study, 75% of subjects aged 60 years or older reported changes in sleep habits, such as decreasing amounts of sleep, frequent awakenings during the night, increasing sleep latency, and early morning awakening(Kim, Oh, Park, & Song, 1997).

The demographic, environmental, psychological correlates of insomnia, which have been previously identified, include the following: older age(Kim et al., 2000; Ohayon & Lemoine, 2002; Shin et al., 2005; Sutton, Moldofsky, & Badley, 2001), lower socioeconomic status(Bixler et al., 1979; Kim et al., 2000), and emotional status(Ford & Kamerow, 1989; Neuman, Enright, Manolio, Haponik, & Wahl, 1997; Ohayon & Lemoine, 2002). In addition, insomnia is more prevalent in women than in men(Bixler, Kales, Soldatos, Kales, & Healey, 1979; Neuman et al., 1997; Ohayon & Hong, 2002). Despite the observed predominance of insomnia in women, large-scale investigations regarding insomnia and sleep patterns and other characteristics of female insomniacs have been rather limited in Korea. In other words, although age, marital status, depression, and environmental factors are well-known factors associated with insomnia, it remains unclear as to whether the increase in the rate of insomnia in women is resultant from any of these factors.

Sleep disturbances have been identified as important health-threatening factors. However, despite the very tangible consequences of chronic sleep disturbances, the majority of individuals who suffer from sleep disturbances do not seek treatment(Sateia et al., 2000; Ohayon & Hong, 2002). Additionally, studies regarding the causes and risk factors of sleep disturbances remain scarce both in the clinical and general populations.

It would appear to be a prerequisite for effective nursing intervention to determine the characteristics of insomnia in women via comparison between an

insomnia group and a control group with regard to sleep patterns and other factors associated with sleep disturbances.

Therefore, the present study was conducted in order to determine the prevalence of insomnia and insomnia-related factors, and to provide basic data for the development of nursing interventions.

## **Objectives**

The objectives of this study were: 1) to investigate the prevalence of insomnia, 2) to compare sleep patterns between those with and those without insomnia, and 3) to compare demographic and obstacles to sleep between those with and without insomnia, and uncover the risk factors of insomnia.

## **Definitions**

### *Insomnia*

Insomnia is defined as a quantitative or qualitative difficulty in sleep(The Great Encyclopedia of Nursing Science, 1995). In this study, insomnia is defined as experiencing at least one symptom among the following: difficulty in initiating sleep(DIS), difficulty in maintaining sleep(DMS), and early morning awakening(EMA). These are also the definitions of the American Psychiatric Association(1994).

### *Sleep pattern*

The concept of sleep patterns usually refers to quantitative or qualitative characteristics of sleep, which include the amount of sleep and time to sleep, as well as subjective appraisals of sleep(Ellis et al., 1981). In the current study, sleep patterns included mean sleeping time, time to fall asleep after going to bed, time between going to bed and getting up, napping, feelings of refreshment and sleep satiation after awakening, and

regularity of sleep.

### *Obstacles to sleep*

Obstacles to sleep are defined as physical, psychological, and environmental factors associated with the quantity and quality of sleep (Foreman & Wykle, 1995). In this study, to sleep included the presence or absence of outside and inside noise, poor temperature, lighting, bed partner, frequent urination during the night, pain or itching, and the intake of caffeine beverages during or prior to sleep.

## METHOD

### **Study design and sample**

This cross-sectional investigation was a descriptive study. The target population for this study consisted of Korean women aged at least 20 years, and subjects who had been previously diagnosed with psychiatric disorders or shift workers. Data from 2000 subjects dwelling in Seoul and Gyeonggi-do were initially collected by the convenience sampling method at welfare centers, elementary schools, middle schools, high schools, or religious centers between September 2003 and December 2003. Most participants using a structured questionnaire, except for illiterate persons. In cases of illiterate participants, 6 research assistants conducted interviews, and they were trained by repeating assessment using the instrument among them. 321 of them in which incomplete information for insomnia diagnosis was provided were excluded from the analysis. Thus, 1,679 subjects were ultimately enrolled in the present study. Written consent forms were obtained at the first meetings with all of the subjects. The IRB approval process was not applied for in this study, as it was not established in 2003, when this study was initially prepared.

### **Measurements**

Information regarding insomnia, sleep patterns, and related factors was assessed via questionnaire. The questionnaires utilized in the study included (a) demographic (6 items), (b) insomnia (3 items), (c) sleep patterns (8 items), and (4) obstacles to sleep (8 items). Questions for defining insomnia were designed by the authors and constructed in consultation with two professional doctors at the sleep-disordered breathing center at the Korea University Ansan Hospital.

The insomnia questions consisted of three questions designed to assess the symptoms of DIS ("Have you had difficulty in falling asleep at night recently?", yes or no), DMS ("Have you woken up during the night after going to sleep and had difficulty in getting back to sleep recently?", yes or no), and EMA ("Have you woken up too early in the morning recently?", yes or no). The questions on sleep patterns included mean sleeping time (hours), time to fall asleep after going to bed (minutes), time to go to bed and get up, napping (yes or no), feelings of refreshment (yes or no) and sleep satiety (yes or no) after awakening, and regularity of sleep (yes or no). In order to assess the obstacles to sleep, on the basis of earlier reports (Fabsitz, Sholinsky, & Goldberg, 1997; Schnelle, Ouslander, Simmons, Alessi, & Gravel, 1993; Tassi, Nicolas, Seegmuller, Dewasmes, Libert, & Muzet, 1993), questions regarding the presence or absence of outside or inside noise, poor temperature, lighting, bed partner, frequent urination during the night, pain or itching, and intake of caffeinated beverages during or prior to sleep were asked of the subjects.

### **Data Analysis**

The data were analyzed with SPSS (Statistical Package for Social Science) version 10.0. The variables

were summarized by means and standard variations (SD) for continuous variables and by frequencies and percentages for categorical variables. In order to determine the prevalence of insomnia according to age groups, chi-squared tests were conducted. In order to compare sleep patterns, general characteristics, and obstacles between subjects with and without insomnia, chi-squared tests and independent group t-tests were conducted. The risk factors were analyzed via logistic regression. All reported p-values were predicated on 2-sided levels of significance and the threshold of statistical significance was 0.05.

## RESULTS

### Prevalence of insomnia

Table 1 shows the prevalence of insomnia to age group. The overall prevalence of insomnia the current study was 32.0%. Approximately one-third of the study population reported that they had suffered from at least one symptom of insomnia, ranging from 26.9% in women in their twenties to 51.2% in those aged 60 years old or over. Segmenting this by age group, the prevalence of insomnia differed significantly with age.

### Differences in Sleep Patterns

Table 2 shows the differences in sleep patterns between the subjects with and without insomnia. Although the average sleeping time in insomniac subjects was significantly(p<.001) shorter compared to those without insomnia, the actual difference was only approximately 15.6 minutes. The time required to initiate sleep was different between the individuals with insomnia compared to the comparison group(p=0.002). With regard to waking time, 13.0% of the insomnia group and 8.6% of the comparison group reported waking up prior to five o'clock; whereas 7.2% of the former and 3.7% of the latter reported waking after eight o'clock(p<.001). The times to go to bed and get up in the subjects with insomnia were at later and earlier times, respectively, than those in the comparison group. A number of subjects in the insomnia group reported that they habitually took naps(p=0.002). Also, 60.6% of the insomnia group answered "no" when asked: you feel better after sleep?", whereas 55.7% of the comparison group answered "yes" to the same question. This shows that there was a significant difference between the two groups with regard to the quality of their "restoration" after sleep. More subjects

**Table 1.** Prevalence of insomnia, including DIS, DMS, and EMA (N=1,679)

Age group (years)	n	DIS n(%)		DMS n(%)		EMA n(%)	
		yes	no	yes	no	yes	no
20-29	405	58(14.3)	347(85.7)	35( 8.6)	370(91.4)	71(17.5)	334(82.5)
30-39	628	73(11.6)	555(88.4)	65(10.4)	563(89.6)	124(19.7)	504(80.3)
40-49	416	45(10.8)	371(89.2)	58(13.9)	358(86.1)	98(23.6)	318(76.4)
50-59	187	40(21.4)	147(78.6)	32(17.1)	155(82.9)	69(36.9)	118(63.1)
>60	43	6(14.0)	37(86.0)	11(25.6)	32(74.4)	20(46.5)	23(53.5)
Total	1,679	222(13.2)	1,457(86.8)	201(12.0)	1,478(88.0)	382(22.8)	1,297(77.2)

Note. DIS: difficulty in initiating sleep, DMS: difficulty in maintaining sleep, and EMA: early morning awakening.

**Table 2.** Differences in sleep pattern between subjects with and without insomnia (N=1,693)

Sleep patterns	† Insomnia(n=538)	No insomnia(n=1141)	t or $\chi^2$	p value
	n(%)	n(%)		
Mean sleep time(hr)*	6.79 ± 1.27	7.05 ± 1.16	-13.275	<.001
Time to fall asleep(min)*	22.10 ± 5.03	22.71 ± 3.83	4.130	.013
Time to go bed				
-10 pm	104(19.3)	153(13.4)	17.457	.002
-11 pm	154(28.6)	383(33.6)		
-12 pm	190(35.3)	453(39.7)		
-1 am	67(12.5)	123(10.8)		
1 am or later	23(4.3)	29(2.5)		
Time to get up				
-5 am	70(13.0)	98(8.6)	23.095	<.001
-6 am	176(32.7)	383(33.6)		
-7 am	180(33.5)	473(41.5)		
-8 am	73(13.6)	145(12.7)		
8 am or later	39(7.2)	42(3.7)		
Napping				
Yes	183(34.0)	305(26.7)	9.408	.002
No	355(66.0)	836(73.3)		
Refreshment after sleep				
Yes	212(39.4)	636(55.7)	39.316	<.001
No	326(60.6)	505(44.3)		
Feeling to enough sleep				
Yes	290(53.9)	764(67.0)	27.015	<.001
No	248(46.1)	377(33.0)		
Regular pattern of sleep				
Yes	233(43.3)	719(63.0)	58.106	<.001
No	305(56.7)	422(37.0)		

\* Mean ± SD.

† Defined when subjects have at least one symptom among DIS, DMS, and EMA.

in the insomnia group than in the comparison group felt that their sleeping time was insufficient(p<.001). Furthermore, 63.0% of the comparison group reported that they went to bed at a "regular" time, whereas the corresponding figure was only 43.3 % in the insomnia group(p<.001).

### Obstacles Associated with Insomnia

These are shown in Table 3. For most of the questions concerning the obstacles to sleep, there are significant differences between the insomnia group and the comparison group.

**Table 3.** Comparison of obstacles for sleep between subjects with and without insomnia (N=1,693)

	Insomnia n(%) (n=538)	No insomnia n(%) (n=1141)	$\chi^2$	p value
Noise outside				
Yes	198(36.8)	164(14.4)	108.760	<.001
No	340(63.2)	977(85.6)		
Noise inside				
Yes	83(15.4)	37( 3.2)	81.794	<.001
No	455(84.6)	1104(96.8)		
Poor temperature				
Yes	42( 7.8)	34( 3.0)	19.711	<.001
No	496(92.2)	1107(97.0)		
Lighting				
Yes	24( 4.5)	14( 1.2)	17.286	<.001
No	514(95.5)	1127(98.8)		
Bed partner				
Yes	93(17.3)	58( 5.1)	66.520	<.001
No	445(82.7)	1083(94.9)		
Frequent urination				
Yes	143(26.6)	149(13.1)	46.520	<.001
No	395(73.4)	992(86.9)		
Pain or itching				
Yes	51( 9.5)	40( 3.5)	25.453	<.001
No	487(90.5)	1101(96.5)		
Intake of caffeine beverage				
Yes	83(15.4)	78( 6.8)	31.128	<.001
No	455(84.6)	1063(93.2)		

**General Associated with Insomnia**

In Table 4, educational level appears to be associated significantly with insomnia. The number of subjects experiencing higher education(over 13 years) was higher in the comparison group than in the insomnia group. On the other hand, neither marital status, being employed, nor monthly income appeared to make any

significant difference with regard to the occurrence of insomnia(p=0.062, 0.138, and 0.324, respectively). However, menopausal status appeared to be a potential factor affecting insomnia in this regard, and the difference of menopausal status was statistically between the subjects with insomnia and the comparison group (p<.001).

**Table 4.** Demographic characteristics associated with insomnia (N=1,693)

	Insomnia(n=538)	No insomnia(n=1,141)	$\chi^2$	p value
	n(%)	n(%)		
<b>Age(years)</b>				
20-29	109(26.9)	296(73.1)	27.664	<.001
30-39	188(29.9)	440(70.1)		
40-49	135(32.5)	281(67.5)		
50-59	84(44.9)	103(55.1)		
60 or over	22(51.2)	21(48.8)		
<b>Education(years)</b>				
None	9(1.7)	7(0.6)	24.337	<.001
1-6	27(5.0)	52(4.6)		
7-9	183(34.0)	294(25.8)		
10-12	142(26.4)	288(25.2)		
13-16	119(22.1)	329(28.8)		
Over 16	58(10.8)	171(15.0)		
<b>Marital status</b>				
Not married	420(78.1)	880(77.1)	9.085	.062
Married	79(14.7)	206(18.1)		
Separated/divorced	15(2.8)	16(1.4)		
Others	24(4.5)	39(3.4)		
<b>Employed</b>				
Yes	354(65.8)	792(69.4)	2.203	.138
No	184(34.2)	349(30.6)		
<b>Monthly Income(thousands won)</b>				
<100	70(13.0)	129(11.3)	3.473	.324
101-200	196(36.4)	403(35.3)		
201-300	146(27.1)	296(25.9)		
Over 301	126(23.4)	313(27.4)		
<b>Menopause</b>				
Premenopause	283(52.6)	776(68.0)	49.968	<.001
Perimenopause	146(27.1)	257(22.5)		
Postmenopause	109(20.3)	108(9.5)		

**Related Factors selected by procedure of Logistic Regression**

Table 5 shows factors related to insomnia. Significant

predictors of insomnia included education level, menopausal status, and some of the obstacles. In the comparison of subjects according to education level, those with between 7 and 9 years of education(OR=

**Table 5.** Related factors of insomnia

	Factors	Classification	OR (95% CI)	p value
Demographic characteristics	Age(years)	20-29	1	
		30-39	1.26(0.90-1.74)	.173
		40-49	1.22(0.83-1.76)	.301
		50-59	1.56(0.95-2.52)	.073
		60 or over	1.86(0.69-4.93)	.214
	Education (years)	No edu.	2.42(0.57-10.16)	.226
		1-6	1.12(0.55-2.27)	.750
		7-9	1.55(1.02-2.35)	.036
		10-12	1.47(0.97-2.23)	.068
		13-16	1.16(0.76-1.76)	.484
	Menopause	Premenopause	1	
		Perimenopause	1.23(0.92-1.64)	.149
		Postmenopause	2.31(1.55-3.44)	.000
Obstacles for sleep	Noise outside	Yes	1.72(1.27-2.34)	.000
		No	1	
	Noise inside	Yes	2.06(1.25-3.42)	.005
		No	1	
	Poor temperature	Yes	1.22(0.66-2.26)	.516
		No	1	
	Lighting	Yes	1.27(0.54-2.98)	.583
		No	1	
	Bed partner	Yes	1.82(1.19-2.77)	.005
		No	1	
	Frequent urination	Yes	1.32(0.97-1.80)	.071
		No	1	
	Pain or itching	Yes	1.31(0.77-2.24)	.311
		No	1	
	Intake of caffeine beverage	Yes	1.89(1.28-2.80)	.001
		No	1	

1.55) were at higher risk of having insomnia. The postmenopausal group evidenced a 2.31 times greater risk of insomnia than was detected in the premenopausal group. Those with both outside and inside noise were significantly associated with 72% and 106%

increases in the odds of having insomnia, respectively. Those with bed partners and consumption of caffeinated beverages had 1.82 and 1.89 times greater odds for insomnia than the comparison group.



## DISCUSSION

This study shows a 32.0% prevalence of insomnia in women over 20 years of age, although the use of different definitions of insomnia and different study samples make it somewhat difficult to exactly determine the prevalence. Table 6 shows the various prevalences of insomnia reported in previous studies. Thus, the prevalence of insomnia found in this study is consistent with that reported by Ohayon and Smirne's(2002) study, which utilized a random sample of adults, as well as with that reported in the study of Morin, LeBlanc, Daley, Gregoire and Merette(2006). It was, however, higher than was seen in the results of other studies. Such inconsistent results are likely due to differences in

study subjects and methods among studies. Only primary care patients enrolled in the study of Simon and Vonkorff(1997), and a larger number of male subjects participated in the studies of Ohayon and Hong (2002) and Liu et al.(2000). The results of these studies can be explained by the findings of earlier studies, namely that women are more likely than men to suffer from insomnia. It is also possible that Voyer, Verreault, Mengue, and Morin's study(2006) reported too low incidence of insomnia among those aged 65 or older, as the study relied on the observations of their nurses.

With regard to insomnia symptoms, the rate of DMS and EMA were highest in the group aged 60 or over. This finding is consistent with the report of Ohayon and Hong(2002). However, it is worth noting that the 20-29

**Table 6.** Prevalence of insomnia in previous reports

Sources	Population	Sampling	Definition of insomnia	Prevalence
Simon & Vonkorff(1997)	primary care patients aged 18 to 65 years (n=373)	stratified random sample completed face-to-face diagnostic assessment	DSM-IV and ICD-10 diagnostic criteria	18%
Liu et al.(2000)	adult people aged 20 and over(n=3,030)	randomly drawn five areas according to geographical location	DSM-IV classification	21.4%
Ohayon & Hong(2002)	general population aged 15 years or older (n=3,179)	random sampling of telephone number	DSM-IV classification	17%
Ohayon & Smirne(2002)	general population aged 15 years or older (n=3,970)	random sampling (Kish sampling procedure) telephone using the Sleep-EVAL system	DSM-IV classification	27.6%
Morin, LeBlanc, Daley, Gregoire, & Merette(2006)	general population aged 18 years or older (n=2,001)	telephone survey was conducted to randomly select a community sample	DSM-IV and ICD-10 classification	29.9%
Voyer, Verreault, Mengue, & Morin(2006)	65 years or older living in public nursing home(n=2,332)	structured and simultaneous interview with two nurse who knew the residents of 28 long term care facilities	DSM-IV-R classification	6.2%

age group evidenced the second highest rate of DIS, and this finding is consistent with the results of the study of Kawada, Yosiaki, Yasuo, and Suzuki(2003) that difficulty falling asleep was highest among the 30~39-year-old age group in Japanese women. Therefore, women in their 20s should be involved in the target population for sleep disturbance interventions.

The present study also determined that the prevalence of insomnia tends to increase with advancing age. This confirms a previous report in which the prevalence of insomnia was shown to increase from 16.0% in Chinese teenagers to 57.7% in elderly Chinese people(Yang, You, Chu, & Han, 1997). This increasing trend of insomnia with increasing age has been well demonstrated in earlier studies, and may be mainly attributable to hormonal changes occurring with age (Manber & Armitage, 2000) and increases in rates of depression(Shin, 1999). Particularly for Korean women, depression may be the result of abrupt shifts in ego identification in their fifties and later(Kim, 1996). Therefore, a nursing intervention program for middle aged women should include ego identity discovery techniques.

Education level and menopause were determined to be closely associated with insomnia in this study, and this is also consistent with the results of other studies (Kim et al., 2000; Kravitz et al., 2003). Gellins et al showed that individuals with fewer years of education experienced greater subjective impairment due to insomnia(Gellis et al., 2005). Although a few studies have reported inconsistent results in that regard, this notion has been bolstered by a number of earlier epidemiological studies in which socioeconomic factors including income, educational level, and employment were shown to be independent risk factors for insomnia. Menopause has also been implicated as an important factor that might partly explain the increasing trend in the prevalence of insomnia with aging in women.

Although the underlying mechanism by which menopause causes insomnia symptoms has yet to be fully investigated, recent studies have supported the hypothesis that the menopausal transition in women is closely related with insomnia(Kravitz et al., 2003; Shin et al., 2005).

In this study, obstacles to sleep included noise, temperature, lighting, the presence of a bed partner, caffeine intake, frequent urination during the night, and pain or itching. In a variety of clinical or healthcare settings, environmental factors, including noise and light, as well as physical factors associated with somatic symptoms have been identified as controllable obstacles associated with insomnia(Schnelle et al., 1993; Tassi et al., 1993). The relationship between nocturia and insomnia in the clinical population has also been reported in some previous studies(Fabsitz et al., 1997; Kim et al., 1999), which suggests that nocturnal urination may cause awakening and/or disruption of sleep at night. As was shown in this study, therefore, a variety of factors, including noise, lighting, the presence of a bed partner, caffeine intake, and frequent urination during the night can be considered as predisposing factors for insomnia in nursing practices.

Significant risk factors for insomnia were education level and menopausal status. This result shows that undereducated or postmenopausal women, particularly, may be part of the primary target population for sleep disturbance intervention protocols.

Shin et al.(2005) previously determined that low education level, low income level, unmarried status, and menopausal status were significant risk factors for insomnia in middle-aged women of ages between 40-64. However, the present study shows that income level and marital status are not significant factors in insomnia. This result is consistent with the result from the Lee study(2004) considering the study population, which included 61.5% women in their 20-30's. Lee's investiga-

tion of the quality of sleep in Korean women adults by age group and income was not a significant factor with sleep, but marital status was an important variable associated with sleep only in late adults(60 years or over).

This study indicated that menopausal status is a significant risk factor for insomnia, consistent with previous research results(Kravits et al., 2003; Shin et al., 2005).

There were certain limitations in this study. Firstly, although a large-scale sample was utilized in this analysis, the problem of sampling bias due to the convenient sampling method remains. Secondly, insomnia was defined only by self-reporting on three questions concerning DIS, DMS, and EMA. Although many previous epidemiological studies have utilized the same definitions as this study, further studies into insomnia using a well-structured questionnaire appear warranted. Finally, the current study did not include a variety of other potential correlates of insomnia, including the presence of medical diseases, physical activity, and medications. In further studies, these factors should also be considered in order to evaluate the correlates of insomnia in women.

## CONCLUSION

The results of this study show that insomnia is prevalent in women(32.0%) and is closely associated with poor sleep patterns, menopause, education, and obstacles to sleep. We also determined that the prevalence of insomnia increases with advancing age, thereby suggesting that age may be a major risk factor for insomnia. These results should be of great interest to healthcare givers, specifically including practical nurses, as they may provide a basis for the development of educational programs and interventions that may mitigate the potential impact of insomnia in women,

and may also result in future studies regarding other potential risk factors in women.

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