

# SLEEP MEDICATION USE IN CANADIAN SENIORS

C Ineke Neutel<sup>1</sup>, Scott B Patten<sup>2</sup>

<sup>1</sup>Department of Epidemiology and Community Medicine, University of Ottawa, Ontario, Canada

<sup>2</sup>Departments of Community Health Sciences and Psychiatry, University of Calgary, Alberta, Canada

Corresponding Author: [cneutel@uottawa.ca](mailto:cneutel@uottawa.ca)

---

## ABSTRACT

### Background

Difficulty sleeping is a common complaint by older people which leads to medication use to help attain sleep.

### Objectives

This study provides a population-based description of medication, specifically taken to help with sleep, by Canadians over the age of 60. The proportion of this sleep medication that is prescribed, and the determinants of prescribed versus over-the-counter (OTC) sleep medication use will also be presented.

### Methods

The Canadian Community Health Survey, 2002, provided the study population of 9,393 respondents over the age of 60.

### Results

Almost 16% of Canadians over 60 reported taking sleep medication over the past year, of which 85% was prescribed by physicians. Sleep medication is higher for women, increases with age, poor health, chronic illness and poor quality sleep, and was especially high for people with a recent major depressive episode. Prescribed sleep medication increased with age, low income, low education, poor health, chronic illness and residence in the province of Quebec. Adjusting for health status or insurance covering medication costs made little difference.

### Conclusions

This study provides important new information on the use of sleep medication by older Canadians. Overall sleep medication use and proportion of sleep medication prescribed are separate parameters with potentially different distributions, e.g., Quebec showed the same amount of sleep medication use as elsewhere, but a much higher proportion of it was prescribed.

**Key words:** *Sleep medication; comorbidity; elderly; quality of sleep*

---

Difficulty sleeping is a relatively common problem especially for older persons.<sup>1,2</sup> To counteract sleeplessness, a variety of sleep medications are available.

Benzodiazepines (BZD) were first introduced in the 1960's and remain the major hypnotics and sedatives on the market.<sup>3,4</sup> Newer classes of medications are making inroads - such as the non-benzodiazepine z-hypnotics<sup>5</sup> that are thought to cause less disruption of normal sleep patterns, less

psychomotor and memory problems and less rebound insomnia.<sup>6,7</sup> Still a meta-analysis did not show any superiority of zopiclone over BZD.<sup>8</sup> Over-the-counter (OTC) sleep medications are mostly antihistamines with sedative effects, such as diphenhydramine and doxylamine.<sup>9,10</sup> Other categories of sleeping aids are herbal and other natural products or alcohol.<sup>11,12</sup> Holbrook et al., consider neither OTC sedatives, nor alcohol, to meet their criterion of sufficient benefit over risk

ratio to be considered acceptable as treatments for insomnia.<sup>2</sup>

Not much is known about the use of medication taken for the express purpose of helping Canadians sleep. Studies using administrative databases are limited to prescription medication and the need to specify specific products, e.g., BZD and/or z-hypnotics.<sup>13</sup> Indication for use in those cases is not known. BZD use is, at times, used as an indicator for sleeping medication use. However, there are many other reasons for using BZD, e.g., anxiety, symptom withdrawal, as an anticonvulsant, and, there are other medications used to induce sleep, e.g., the OTC sleep medications about which especially little is known.

Important information on prescription and OTC sleep medication use in Canadian seniors were reported by two studies.<sup>9,11</sup> In one study, half of the 176 seniors contacted during hospital or pharmacy visits, had used therapies in the past year to help them sleep. Of which 50% were OTC medication (broadly defined); 17% were prescription medications and 34% were non-drug activities such as walking.<sup>11</sup> The OTC products reported were mostly antihistamines, but also included acetaminophen, alcohol and herbal products.<sup>11</sup> The respondents perceived the sleep medications to be effective although some adverse effects were mentioned. A larger study by the same researchers (N=364), also of seniors visiting pharmacies, reported 61% lifetime use of sleeping products, of which 83% were prescription and 17% OTC medications.<sup>9</sup> Most use was long-term and very few reported using both prescription and OTC products. Both of these studies, although very informative, were on rather select groups of seniors, i.e., those visiting outpatient clinics or pharmacies. Information that is more representative is needed regarding the use of sleep medication in the Canadian population. The objective of this study is to provide a population-based description of the use of sleep medication by Canadian seniors in the community. This study will determine what proportion of Canadians over 60 years of age take sleep medication, what proportion of sleep medication used is prescribed, and what differences characterize seniors taking prescribed or OTC sleep medications.

## METHODS

The study subjects were respondents to the Canadian Community Health Survey (CCHS) cycle 1.2, conducted in 2002. The CCHS contains a randomly selected sample of 36,984 Canadian respondents over the age of fifteen. Most interviews were done person-to-person, and between May and December 2002. Maximizing response rates was done by making all reasonable attempts to obtain interviews leading to a response rate of 77%. For this study, only the 9,393 respondents over the age of 60 were included, a subset representative of Canadians over 60 living in private dwellings. Respondents from the Territories were not included in this survey because of the small numbers and special considerations, nor were residents of Indian Reserves or institutions. In a probability sample, each respondent represents a number of people depending on the proportion of the population sampled. Weighting the data during analysis adjusted the information collected so that it was representative of the Canadian population.

Sleep medication use was requested by the question: "*In the past 12 months, that is from the date one year ago to yesterday did you use any medication to help you sleep, such as Imovane, Nytol or Starnoc?*" The examples given indicate that this question is to include both prescribed and OTC medication. Respondents were also asked whether the medication was prescribed by a physician: "*Did you take medication to help you sleep under the supervision of a health professional?*" Those who answered 'yes' were asked a series of questions including: "*Did a psychiatrist (or family doctor, general practitioner or another medical doctor) prescribe the medications to help you sleep?*" For this study, any affirmative answer about sleep medication prescription by a physician was used to designate the medication as prescription medication, while the remainder was considered OTC. Thus, OTC medications as defined here would have included some herbal or "alternative" medications. However, separate questions were also asked about the use of products, such as St. Johns Wort, Valerian, chamomile, kava kava, etc., which were combined as one category of herbal products.

Many questions were asked about background information, such as age, sex, province of residence, lifestyle-related, e.g., family income and education, and health-related, e.g., self-perceived health status, chronic medical conditions, depression and stress issues. Questions on chronic conditions were introduced by the statement: “*Now I would like to ask about certain chronic health conditions which you may have. We are interested in long-term conditions which are expected to last or already have lasted six months or more, and that are diagnosed by a health professional.*” This is followed by a series of questions like “*Do you have arthritis?*” or “*Do you have diabetes?*” and so on. Self-perceived stress was determined by the lead-in question: “*Thinking about the stress in your life would you say that most days are . . .*” which was followed with a choice of five categories ranging from ‘not at all stressful’ to ‘extremely stressful’ which was dichotomized for this study - ‘least stress’ included the two lowest stress categories versus ‘stressed’ as the other three. A similar format was used for self-reported health status where the healthiest two categories were combined to be compared with the other three. Major Depression was evaluated in the CCHS 1.2 using a validated, fully structured diagnostic interview, the Composite International Diagnostic Interview.<sup>14</sup> Respondents were considered to be or have been depressed if they experienced a major depressive episode in the past year, according to this diagnostic instrument, which is based on criteria from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV).<sup>14</sup>

For analysis, SAS version 9.1, (SAS Institute Inc., Cary, NC) was used. Weighted logistic regression models were fit for each variable separately, and adjusted for age and sex. All tables except for Table 1 are weighted for the Canadian population. Variances for statistical significance were determined with weights scaled according to sample size. In some tables, different columns may have different denominators, but the headings at the top of the columns and the examples given below the tables, will provide the necessary guidance.

**TABLE 1** Total sleep medication (SM) and prescribed (Rx) sleep medication use by seniors - unweighted

Age	Population N (%)	Proportion SM use N (%)	Proportion Rx use N (%)
Male	3764	487 (12.9)	412 (84.6)
Female	5629	1119 (20.2)	972 (86.9)
All	9393	1606 (17.1)	1384 (86.2)

## RESULTS

Seventeen percent of the sample took sleep medication over the past twelve months, of which 86% was prescribed by physicians (Table 1). Women were more likely to take sleep medication than men as shown in the sample data in Table 1, and the weighted data in Table 2. Respondents in poor health reported more than double the sleep medication use, including a considerably higher proportion of prescription medication use (Table 2). The next highest OR was 1.6 for the oldest age group, 80 and over, who had an even larger proportion of prescribed medication use. Neither education, nor income, affected the overall sleep medication use when adjusted for age and sex. However, even with the total use constant, people in the lowest income quartile were 3.0 times more likely to use prescribed sleep medication than the highest income quartile, while people who did not complete high school were 1.6 times more likely to use prescribed sleep medication (Table 2). Adjusting for health status, nor for insurance coverage for medication had little impact on these OR (not shown in table). The provinces show little difference in overall proportions of the population using sleep medication but do show a difference in proportions of prescribed or OTC medication. Particularly, the province of Quebec shows five times the prescription medication use when compared to British Columbia as the reference population. Again, adjusting for health status did not alter the OR, nor did adjusting for stress or insurance covering prescription costs (not shown in table).

**TABLE 2** Prescribed (Rx) and over-the-counter (OTC) sleep medication use in seniors - weighted for the Canadian population, 2002

Variables	Population <sup>1</sup>		Sleep medication use					
			Among the population <sup>2</sup>			Among those taking medication for sleeping <sup>3</sup>		
			%	OR	OR	% Rx	% OTC	OR <sup>4</sup> : Rx/OTC
All (N=9393)		17.0	15.9			85.6	14.4	
Sex	Male	46.2	12.8	1.0	1.0	83.7	16.3	1.0
	Female	53.8	18.6	1.5*	1.5*	86.7	13.2	1.2
Age	60-69	49.8	13.2	1.0	1.0	80.8	19.2	1.0
	70-79	35.2	17.9	1.4*	1.4*	87.4	12.6	1.6*
	80+	15.1	20.1	1.6*	1.5*	92.2	7.6	2.9*
Partner	Yes	35.4	17.8	1.0	1.0	83.8	16.2	1.0
	No	64.6	14.8	0.9	1.0	88.2	11.8	1.0
Income quartiles	1st (Low)	12.6	18.8	1.2	1.1	92.7	7.3	3.0*
	2nd	29.8	17.1	1.1	1.0	87.8	12.3	1.8*
	3rd	31.2	14.8	1.0	0.9	85.6	14.5	1.6*
	4th (High)	15.4	15.2	1.0	1.0	73.3	26.7	1.0
Insurance for Rx	Yes	75.9	16.2	1.1	1.0	85.6	14.4	1.0
	No	24.1	14.9	1.0	1.1	85.6	14.4	1.0
Finished high school	Yes	46.6	15.0	1.0	1.0	81.2	18.8	1.6*
	No	53.5	16.8	1.1	0.9	88.8	11.2	1.0
Health status	Poor	56.3	20.6	2.3*	2.3*	90.2	9.8	3.4*
	Good	43.7	9.9	1.0	1.0	73.5	26.6	1.0
Smoking	Yes	17.8	17.6	1.3*	1.2	84.8	15.2	1.2
	No	82.2	15.5	1.0	1.0	85.8	14.2	1.0
Activity level	Inactive	51.4	18.5	1.4*	1.2	88.1	12.0	1.5*
	Active	48.6	13.2	1.0	1.0	82.1	17.9	1.0
BMI	<25	44.5	15.0	1.0	1.0	88.6	11.4	1.3
	25-30	38.5	17.3	1.3*	1.3	83.3	16.7	0.9
	30+	17.1	15.1	1.1	1.0	84.0	16.0	1.0
Alcohol	<9drinks/wk	37.9	14.8	1.0	1.0	83.2	16.8	1.0
	9+drinks/wk	42.1	17.4	1.2	1.0	88.5	11.5	1.5*
Rural/ urban	Urban	890.7	16.2	1.0	1.0	86.3	13.7	1.0
	Rural	19.3	14.7	0.9	0.9	82.8	17.2	1.2
Regions in Canada	Atlantic	8.0	16.0	1.1	1.1	86.0	14.0	1.9*
	Quebec	25.6	16.7	1.2	1.2	94.5	5.6	5.0*
	Ontario	38.5	15.8	1.1	1.1	81.9	18.1	1.3*
	Prairies	14.6	16.2	1.2	1.2	85.3	14.7	1.7*
	BC	13.4	14.4	1.0	1.0	78.2	21.8	1.0

Odds Ratios (OR) are statistically significant at  $p < 0.05$

**Explanation of column headings:** 1. Population %: Percentage of people with that variable in the source population, e.g., 49.8% of source population weighted for the Canadian population is aged 60-69. 2. Proportion of people in that category taking sleep medication, e.g., 13.2 % of people aged 60-69 take sleep medication. 3 .Proportion of people taking Rx or OTC sleep medication, e.g., of people aged 60-69 80.8% take Rx and 19.2% take OTC sleep medication adjusted for age and sex. 4.OR Rx/OTC: Likelihood of people taking prescription medication, adjusted for age and sex, among population taking sleep medication, e.g., people aged 80+ are 2.9 times more to take Rx sleep medication than are seniors aged 60-69, adjusted for sex and single years of age.

People with any of the chronic conditions examined, except diabetes, were more likely to take sleep medication, especially prescribed medication (Table 3). The condition most strongly associated with sleep medication use was major depression, at about six times that of other Canadians of this age group. Most of the people taking antidepressant medication also used sleep medication, nearly all prescribed. Other conditions showing twice the sleep medication use were fibromyalgia, stress, back problems, gastrointestinal problems or other pain-related conditions. People with the greatest increase in prescribed medications were in poor health or had cancer, cardiovascular disease, or asthma. People reporting the use of herbal and natural products used less prescribed sleep medication.

In the CCHS 1.2, several questions were asked about quality of sleep. (Table 4) More than one third of people who had trouble sleeping and one quarter of people who rarely found sleep refreshing reported taking sleep medication. Only a small proportion of people reported having difficulty staying awake during times that they would like to be awake. The survey also asked about the number of hours people normally sleep per night. People sleeping less than six hours per night are the most likely to take sleep medication- and more likely to take prescribed rather than OTC medications. People getting more than nine hours of sleep per night are also more likely to take sleep medication and more likely to take prescribed sleep medication. Adjusting for health status lowered the OR only slightly (not shown in table).

**TABLE 3** Prescribed (Rx) and over-the-counter (OTC) sleep medication use in seniors - weighted for the Canadian population, 2002

Variables	Population		Sleep medication use				
			Among the population		Among those taking medication for sleeping		
			%	OR <sup>4</sup>	Rx	OTC	OR <sup>4</sup> : Rx/OR
All (N=9393)		17.0	15.9		85.6	14.4	
<b>Chronic conditions</b>							
Stressed	Yes	12.2	28.5	2.5*	87.7	12.3	1.4*
Health status	Worse	56.3	20.6	2.3*	90.2	9.8	3.4*
Depression	Yes	2.1	44.9	5.9*	86.9	13.1	1.4
Allergies	Yes	27.6	20.1	1.4*	85.1	14.9	1.1
Arthritis	Yes	43.0	20.1	1.6*	89.0	11.0	1.6*
Asthma	Yes	7.6	21.5	1.4*	92.4	7.6	2.0*
Back problems	Yes	25.4	24.0	2.1*	86.1	13.8	1.1
Cancer	Yes	5.7	20.2	1.4*	94.9	5.1	3.1*
CVD	Yes	20.0	23.1	1.8*	92.6	7.4	2.4*
Diabetes	Yes	12.6	17.6	1.2	90.8	9.2	1.7*
COPD	Yes	7.8	23.4	1.6*	92.9	7.1	1.7*
Fibromyalgia	Yes	1.7	39.4	3.5*	85.0	15.0	1.1
GI problems	Yes	5.3	26.7	2.1*	89.8	10.2	1.7*
Painful conditions	Yes	54.0	20.3	2.0*	88.1	11.9	1.8*
<b>Concomitant medication in past 30 days</b>							
Antidepressants	Yes	5.2	57.0	8.5*	97.8	2.2	10.8*
CVD meds	Yes	10.3	73.2	25.6*	91.5	8.5	2.2*
Herbal sleep products	Yes	1.1	28.5	2.0*	64.8	35.2	0.3*

\* Odds Ratio (OR) are statistically significant at p<0.05

Note: For an explanation of column headings - see Table 2

**TABLE 4** Prescription (Rx) and over-the-counter (OTC) sleep medication use by quality of sleep measures for seniors - weighted for the Canadian population, 2002

Variables		Population	Sleeping medication use					
			Among the population			Among those taking medication for sleeping		
						Rx	OTC	Rx/OTC
	%	%	OR	%	%	OR		
How long do you usually spend sleeping each night?	<6 hrs	16.6	26.8	2.5*	89.9	10.1	2.0	
	6-7 hrs	20.8	15.6	1.3*	81.0	19.0	1.0	
	7-8 hrs	29.9	12.1	1.0	81.9	18.1	1.1	
	8-9 hrs	24.7	13.3	1.1	86.6	13.4	1.5	
	9+ hrs	7.9	15.9	1.3*	90.5	9.5	1.9	
How often do you have trouble going to sleep or staying asleep?	Rarely	83.4	11.5	1.0	83.4	16.6	1.0	
	Often	16.6	38.1	4.6*	89.1	10.9	1.6	
How often do you find your sleep refreshing?	Often	74.1	11.4	1.0	85.5	14.3	1.0	
	Rarely	25.9	28.9	3.1*	85.8	14.2	0.9	
How often do you find it difficult to stay awake when you want to?	Rarely	94.3	15.4	1.0	85.7	14.4	1.0	
	Often	5.7	24.7	1.8	85.2	14.8	1.1	

\* Odds ratios (OR) are statistically significant at  $p < 0.05$ .

Note: For an explanation of column headings - see Table 2

## DISCUSSION

About one in six Canadians over the age of 60 reported taking sleep medication during the past year, 86.2% of whom reported that the medication was prescribed by a physician. Women took more sleeping medication, as did respondents over the age of 80, those in poor health, with chronic illness and, not surprisingly, people reporting poor quality sleep. The highest OR was for people who suffered a major depression in the past year, many of whom also took antidepressants. More prescribed medication was taken by people over the age of 80, with low income, in poor health, with chronic illnesses, and residents of the province of Quebec. Before considering these and other results in more detail, we will examine strengths and limitations of this study.

These data have considerable strengths, such as the large amount of data, e.g., background, health-related and lifestyle variables, available on a large study population. Especially important were questions on quality of sleep and the use of medications to help with sleep. A specific

question was asked on whether the medication was prescribed by a physician, whether general practitioner or specialist. All sleep medication use not reported to be prescribed by a physician, was assumed to be some type of OTC medication. Busto et al found that 83% of their population took prescription sleep medication while 17% took OTC,<sup>9</sup> which is very similar to our findings of 85% for prescription medication and 15% for OTC. This would indicate that the category of OTC medication in our study is not casting a much wider net than a study in which more is known about what OTC medication was used.

A limitation of this study may be the long time frame in the question about sleep medication use - any time in the past twelve months. A shorter time frame might have been more accurate in terms of recall. However, other studies ask for similar or even longer time frames, e.g., Busto et al., asked for lifetime use of sleeping medications,<sup>9</sup> which for seniors covers much ground. In any case, a large proportion of sleep medication use is known to be long-term, even for many years<sup>9,15</sup> and would be counted only once whether the time

frame is one month or twelve months. Additionally, while the overall level of the sleep medication use rate may vary with the length of the time frame, the patterns of use would be less affected.

Another potential limitation may be the self-reported nature of the data. In the case of a general question such as “*Did you use any medication to help you sleep?*” one would not expect there to be as much of a misclassification problem as for a question asking for specific products, e.g., “*Did you use benzodiazepines?*” In any case, for a question which emphasizes purpose of use rather than then specific products, there is little choice but to rely on self-report. Another problem was with the structure of the questionnaires in that there was no specific question on OTC use. However, there was a question specific to whether the sleep medication use was prescribed by a physician, and it is reasonable to assume that sleep medication that was not prescribed belongs to the OTC category, possibly broadly defined. However, it does make it difficult to identify those who took both prescribed and OTC sleep medication over the past year. People who used both would have to say ‘yes’ to the question whether the sleep medication was prescribed by a physician, in which case, the proportion using OTC medication may be underestimated. This is likely to be a minor issue since previous research has found that most people tended to stay with the same sleep medication and very few took both prescription and OTC sleep medication.<sup>9</sup>

Both age and sex are important determinants of sleep medication use. That more women take sleep medication than men, corresponds with other studies, regardless of how the use of sleep medication was measured.<sup>15-19</sup> No particular reason can confidently be given for this greater use of sleep medication by women, except that it is in line with the greater medication and health care use by women in general.<sup>15,20</sup> Women tend to have a greater morbidity in terms of chronic diseases and tend to be more compliant when taking medication.<sup>21</sup> Even within this elderly population, sleep medication use increased with age. One in five respondents over 80 years of age took sleep medication, compared to one in eight of the younger seniors. Other studies have found an increase of BZD use with age; although, most

of these studies compare elderly people with younger age groups, e.g., below 60 years of age,<sup>15,16, 22</sup> rather than different age levels above 60 as in this study. The older seniors were also more likely to take prescribed sleep medication than younger seniors. This may well relate to the increasing occurrence of chronic disease and other discomforts associated with age and the increasing likelihood of sleep issues with age. A possible contributing factor that needs to be investigated may be that people start using sleep medication for a health-related reason, then developed a psychological or physiological tolerance to the medication, making discontinuation difficult.

Socio-economic class is often defined by income or education levels. This study found that neither income nor education levels in this elderly population affected sleep medication use, as adjusted for age. Yet, people with lower income or less education were more likely to take a prescribed sleep medication than people in the higher income or more education categories. If people struggling with a low income, have more anxiety or insomnia as a result, they may well be more likely to take a prescribed sleep medication. Another potential explanation is that prescribed medication is often covered by insurance, whereas OTC medication is not. In Canada, all residents over the age of 65 have insurance for selected medications, which would include most commonly prescribed medications, but never OTC medication. Extra insurance would be especially useful for covering the cost of prescribed medication in the age group 60-65 as well as for medication not covered by the provincial formularies in older age groups. However, having insurance for medication costs did not increase overall or prescribed sleep medication use.

Lifestyle factors potentially relevant to the use of sleep medications include stress, physical activity and BMI. Suffering from stress was associated with a doubling of sleep medication use and an increase in the proportion of respondents taking prescription sleep medication. People who led a very sedentary lifestyle were also more likely to use sleep medication, which may be related to an increased likelihood of having activity-limiting conditions. Thus, people with chronic disease may be more likely to have a sedentary lifestyle and more likely to use prescription sleep medication. However, this was

not borne out by adjusting the OR for health status. In terms of BMI, other research has shown an association between quality of sleep and BMI; for example, Krueger et al. found that obese people slept shorter hours on average, while underweight people were overrepresented in both the shortest and longest sleep duration categories.<sup>23</sup> This finding was not reflected in the sleep medicine use results of this study.

Increased alcohol use combined with prescription sleep medication use may relate to the fact that alcohol has both stimulant and sedative effects. While one may fall asleep quicker, there is also the increased likelihood that one may wake up again within a few hours. That alcohol users were more likely to use prescription sleep medication is consistent with Roehrs's finding that sleep loss associated with alcohol use was stronger than the sedative effect.<sup>24-26</sup> In spite of this, people continue to use alcohol as a sleeping aid.<sup>27</sup> Other lifestyle factors such as smoking and marital status showed little association with sleep medication use in this study; although, they have been reported to be related to higher prevalence of insomnia.<sup>1</sup>

An interesting issue is the extent to which location of residence affects the use of sleep medication. The regions of residence in Canada show little variation with overall sleep medication use but a great deal of variation with prescribed medication. The western most province of British Columbia, showed the lowest proportion of prescribed medication use while the province of Quebec had by far the highest proportion at more than five times that of British Columbia. Quebec is known to have a higher use of BZD and the increase in the prescribed category points to the increased use of BZD or z-hypnotics.<sup>28</sup> Since adjusting for health status had very little effect, it seems that this discrepancy is due to prescribing patterns rather than differences in health status. Ohayon compared psychotropic drug use for sleep disorders in France with that in the province of Quebec and found that such drug use was even higher in France than in Quebec.<sup>29</sup>

The presence of chronic disease clearly increases the likelihood of sleep medication use and every condition tested shows an increased use of sleeping medication. The highest ORs are for depression, which is known to be accompanied by sleeping problems, and for fibromyalgia, which is

a very painful disease. Other painful conditions such as back problems, gastrointestinal problems and a general rubric of pain-related conditions were also shown to lead to increased sleep medication use. A greater variation is shown in the proportion of prescribed sleep medication use for the various chronic conditions with a tripling for cancer patients and a doubling for asthma and cardiovascular patients. These certainly are conditions that lead to discomfort when trying to sleep, as well as to frequent visits to their physician, both of which might boost prescribed sleep medication use. The great increase of sleep medication use, especially prescribed medication, with the use of other medications such as antidepressants and cardiovascular medications raises the specter of polypharmacy so common among seniors.

One may expect that the most immediate reason for taking sleep medication would be difficulty sleeping and, fortunately, the CCHS provided a number of questions about quality of sleep. The results indicated that people having the shorter nights or a lesser quality of sleep were definitely taking much more sleep medication. Benca found that 24% of people with sleep difficulty used OTC sleep medicine<sup>10</sup> which is higher than the proportions in this study. Considering our results, one may also wonder why so many who rarely have difficulty sleeping are still taking sleep medication, and mostly prescribed medication at that. One possibility is that the medication continues to be effective and as long as they take the medication, they have no difficulty sleeping. Another possibility is that with the long time frame of the question, they had to answer 'yes,' even when their difficulty sleeping and their sleep medication use was months ago and no longer a problem. Another possibility is that people may continue taking sleep medication because of the worry that discontinuing it leads to wakefulness. In terms of length time sleeping, people sleeping less than six hours per night are the most likely to take sleep medication. This group is also more likely to take prescribed rather than OTC medication. More surprisingly, people sleeping more than nine hours of sleep per night are also more likely to take sleep medication and also more likely to take the prescribed variety. This is difficult to explain and may be worth further investigation.



Ancoli-Israel indicates that difficulty falling asleep or difficulty staying asleep, are among the most common complaints of elderly people.<sup>30,31</sup> But she does not think such complaints need to be inevitably associated with aging. She suggests that the complaints may be secondary to medical and psychiatric illnesses, their treatments or other sleep disorders. The 'NIH State-of-the-Science Conference on Chronic Insomnia in Adults' also concluded that insomnia is often comorbid with other chronic conditions, especially depression.<sup>1</sup> When there are no such comorbid conditions, the authors suggest that insomnia should be considered a primary disorder. In this study, while people who report poor health were much more likely to take sleep medication, adjusting hours of sleep or quality of sleep for poor health had little effect. Even adjusting for depression had little effect in spite of the large OR for sleep medication use in people who had serious depression in the last year. It appears that sleep medication is frequently used for insomnia as a primary condition, or because of tolerance, dependence or habit.

A group of seniors that have quite different patterns of sleep medication use are the users of herbal products. Compared to the average respondent, they are twice as likely to use sleep medication but have a very low rate of prescribed medication use. This is as to be expected since some of their use of herbal products may have been included with the OTC sleep medication category. However, at one percent they are only a very small proportion of the total population and would not affect other results.

In conclusion, this article provides important new information on the use of medication specifically taken to help Canadian seniors sleep. Patterns of sleep medication use by a variety of other populations attributes were presented for both prescribed and OTC sleep medication use. Both insomnia and its treatment greatly affect quality of life, especially for elderly people.<sup>1</sup> As we have seen, 17% of seniors, 20% of the over 80 years of age group used sleep medications, which may well be in addition to medications taken for other conditions. This will add to the polypharmacy which is already a concern in the elderly. Seniors are at risk for other chronic conditions and may take large numbers of different medications each day, putting them at

risk for adverse drug reactions and drug-drug interactions. Since such a large proportion of sleep medication users claim that their sleep medication use was prescribed and supervised by their physician, the physician is well positioned to help ensure that the sleep medication is a useful addition to their health care rather than a detriment to their health. For the OTC use, physicians need to remain vigilant in eliciting information on OTC medications and evaluate their effect.

## REFERENCES

1. State-of-the-Science Panel. National Institutes of Health State-of the-Science Conference statement on manifestations and management of chronic insomnia in adults, June 13–15, 2005. [http://consensus.nih.gov/2005/2005InsomniaSO\\_S026html.htm](http://consensus.nih.gov/2005/2005InsomniaSO_S026html.htm)
2. Holbrook AM, Crowther R, Lotter A, Cheng C, King D. The diagnosis and management of insomnia in clinical practice: a practical evidence-based approach. *CMAJ* 2000;162:216-20.
3. Pagel JF, Parnes BL. Medications for the Treatment of Sleep Disorders: An Overview. *Prim Care Companion J Clin Psychiatry* 2001;3:118-125.
4. Ancoli-Israel S. Insomnia in the elderly: a review for the primary care practitioner. *Sleep* 2000;23 Suppl 1:S23-30.
5. Hausken AM, Furu K, Skurtveit S, Engeland A, Bramness J. Starting insomnia treatment: the use of benzodiazepines versus z-hypnotics. A prescription database study of predictors. *Euro J Clin Pharmacol* 2009;65:295-301.
6. Wagner J, Wagner ML. Non-benzodiazepines for the treatment of insomnia. *Sleep Med Rev.* 2000; 4:551-581.
7. Terzano MG, Rossi M, Palomba V, Smerieri A, Parrino L. New drugs for insomnia: comparative tolerability of zopiclone, zolpidem and zaleplon. *Drug Saf* 2003;26:261-82.
8. Holbrook AM, Crowther R, Lotter A, Cheng C, King D. Meta-analysis of benzodiazepine use in the treatment of insomnia. *CMAJ* 2000;162:225-33.
9. Busto UE, Sproule BA, Knight K, Herrmann N. Use of prescription and nonprescription hypnotics in a Canadian elderly population. *Can J Clin Pharmacol* 2001;8:213-21.

10. Benca RM. Diagnosis and treatment of chronic insomnia: a review. *Psychiatr Serv* 2005;56:332-43.
11. Sproule BA, Busto UE, Buckle C, Herrmann N, Bowles S. The use of non-prescription sleep products in the elderly. *Int J Geriatr Psychiatry* 1999;14:851-7.
12. Roehrs T, Hollebeek E, Drake C, Roth T. Substance use for insomnia in Metropolitan Detroit. *J Psychosom Res* 2002;53:571-6.
13. Bartlett G, Abrahamowicz M, Tamblyn R, Grad R, Capek R, du Berger R. Longitudinal patterns of new Benzodiazepine use in the elderly. *Pharmacoepidemiol Drug Saf* 2004;13:669-82.
14. Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:83-121.
15. Neutel CI. The epidemiology of long-term benzodiazepine use. *Int Rev Psychiatry* 2005;17:189-97.
16. Barbui C, Gregis M, Zappa M. A cross-sectional audit of benzodiazepine use among general practice patients. *Acta Psychiatr Scand* 1998;7:153-156.
17. Balkrishnan R, Rasu RS, Rajagopalan R. Physician and patient determinants of pharmacologic treatment of sleep difficulties in outpatient settings in the United States. *Sleep* 2005;28:715-9.
18. Ohayon MM, Caulet M. Insomnia and psychotropic drug consumption. *Prog Neuropsychopharmacol Biol Psychiatry* 1995;19:421-31.
19. Fourrier A, Letenneur L, Dartigues JF, Moore N, Begaud B. Benzodiazepines use in an elderly community-dwelling population. Characteristics of users and factors associated with subsequent use. *Eur J Pharmacol* 2001;57:419-425.
20. Neutel CI, Walop W. Drug utilization by men and women: Why the difference? *Drug Information Journal* 2005;39:299-310.
21. DesMeules M, Stewart D, editors. Women's health surveillance report. A multi-dimensional look at the health of Canadian women. Ottawa, Canada: Health Canada, 2003.
22. Mah L, Upshur RE. Long term benzodiazepine use for insomnia in patients over the age of 60: discordance of patient and physician perceptions. *BMC Fam Pract* 2002; <http://www.biomedcentral.com/1471-2296/3/9>;
23. Krueger PM, Friedman EM. Sleep duration in the United States: A cross-sectional population-based study. *American Journal of Epidemiology* 2009;169:1052-1063.
24. Roehrs T, Burduvali E, Bonahoom A, Drake C, Roth T. Ethanol and sleep loss: a "dose" comparison of impairing effects. *Sleep* 2003;26:981-5.
25. Roehrs T, Papineau K, Rosenthal L, Roth T. Ethanol as a hypnotic in insomniacs: self administration and effects on sleep and mood. *Neuropsychopharmacology* 1999;20:279-86.
26. Roth T, Roehrs T. Insomnia: epidemiology, characteristics and consequences. *Clin Cornerstone* 2003;5:5-15.
27. Mendelson WB, Roth T, Cassella J, et al. The treatment of chronic insomnia: drug indications, chronic use and abuse liability. Summary of a 2001 New Clinical Drug Evaluation Unit meeting symposium. *Sleep Med Rev* 2004;8:7-17.
28. Tamblyn RM, McLeod PJ, Abrahamowicz M, et al. Questionable prescribing for elderly patients in Quebec. *CMAJ* 1994;150:1801-1809.
29. Ohayon MM, Caulet M. Psychotropic medication and insomnia complaints in two epidemiological studies. *Can J Psychiatry* 1996;41:457-64.
30. Ancoli-Israel S, Poceta JS, Stepnowsky C, Martin J, Gehrman P. Identification and treatment of sleep problems in the elderly. *Sleep Med Rev* 1997;1:3-17.
31. Shochat T, Loreda J, Ancoli-Israel S. Sleep Disorders in the Elderly. *Curr Treat Options Neurol* 2001;3:19-36.