

INTRODUCTION

Chronic insomnia affects more than 10% of the adult population and is associated with substantial direct and indirect costs.¹⁻³ The specific cost of absences in the workplace is estimated to be approximately \$57 billion per year.² Using self-report data, 41% of employees with sleep problems reported missing work due to illness in a 4-week time period compared with 29% of employees without sleep problems.⁴ However, few studies have evaluated the impact of insomnia on work absences using objective data. The goal of the current study was to objectively examine employee work absences associated with insomnia, quantifying lost time and associated costs by specific type of absence and to compare them with employees without insomnia.

METHODS

- A retrospective analysis was performed on data (2001 to 2006) from the Human Capital Management Services (HCMS) Research Reference Database consisting of approximately 510,000 employees representing the retail, service, manufacturing, and financial industries.
- Employer payroll and disability insurance records were collected and analyzed for work absences.
- Comparisons were made between 2 groups:
 - The insomnia group consisted of employees with a record of insomnia diagnosis, identified by the presence of *International Classification of Diseases*, 9th Revision (ICD-9) diagnostic codes or prescriptions for a hypnotic agent.
 - ICD-9 codes used to identify employees with a primary, secondary, or tertiary diagnosis included: 307.41 (transient disorder of initiating or maintaining sleep), 307.42 (persistent disorder of initiating or maintaining sleep), 307.49 (subjective insomnia), and 780.52 (insomnia).
 - Hypnotic agents included ramelteon, zaleplon, zolpidem, and eszopiclone.
 - The non-insomnia group (control) consisted of employees with no record of an insomnia diagnosis (ICD-9 codes) and no prescription for a hypnotic agent.
- The index date in the insomnia group was defined as the date of first diagnosis of insomnia or initial hypnotic prescription.
- The average index date in the insomnia group was used as the index date for the control group.
- Employees in both groups were compared over the 12 months following the index date.

- Employees included in the analysis were required to be continuously employed and eligible for health benefits for at least 12 months after their index date.
- Lost time in days and costs for paid absences were compared between the insomnia and control groups for the following work absences:
 - Sick leave
 - Short-term disability
 - Long-term disability
 - Workers' compensation

Statistical Analysis

- Two-part regression analysis was used to model the lost time and salary replacement cost differences between the insomnia and control groups using separate regression models for each of the 4 outcomes measures.
- The models controlled for population differences in age, sex, marital status, race, exempt/non-exempt work status, full-time/part-time status, salary, comorbid mental disorders, Charlson Comorbidity Index,⁵ and geography (defined by the first digit of the employee's postal zip code).
- All costs were adjusted to 2006 dollars.
- Demographic comparisons between groups were made using *t* tests for continuous variables and chi-square (χ^2) tests for binary variables.
- Differences were considered significant if $P < 0.05$.

RESULTS

- A total of 294,042 employees were included in this analysis, of which 12,308 (4.19%) were assigned to the insomnia group. Demographics for both the insomnia and control groups are detailed in Table 1.
- Employees in the insomnia group had significantly more annual absence days per year and higher annual health-related lost time benefit costs than those in the control group (Tables 2 and 3).
 - Sick leave and short-term disability were responsible for 86% of the incremental absences and 73% of the incremental health-related lost time benefit costs (Figure 1).
- Insomnia was associated with a significant annual increase in work absences (5.01 days, $P < 0.0001$) and health-related lost time benefit costs (\$869, $P < 0.0001$) per employee (Tables 2 and 3).

Table 1. Demographic Differences Between Employees With and Without Insomnia

Category	Insomnia Group		Control Group		Difference ^{a,b}
	n	Mean ^b (SE)	n	Mean ^b (SE)	
Age at index date (years)	12,306	42.59 (0.08)	281,718	40.16 (0.02)	2.43
Annual salary (\$US)	12,256	61,365 (551)	278,349	49,509 (167)	11,856
Female gender (%)	12,308	57.0 (0.4)	281,734	41.2 (0.1)	15.8
Married (%)	11,720	56.2 (0.5)	257,156	56.2 (0.1)	0.0
Race	10,372		207,655		
White (%)		74.8 (0.4)		60.6 (0.1)	14.3
Black (%)		7.5 (0.3)		18.0 (0.1)	-10.5
Hispanic (%)		8.7 (0.3)		9.6 (0.1)	-0.8
Exempt status (%)	12,308	44.2 (0.4)	281,726	28.0 (0.1)	16.2
Full-time employee (%)	12,308	94.8 (0.2)	281,734	88.4 (0.1)	6.4

^aAll comparisons, except married %, were significant ($P < 0.005$).
^bNumbers have been rounded; differences are based on original numbers.
 SE = Standard Error

Table 2. Comparison of Annual Work Absence Days Between Employees With and Without Insomnia

Absence Category	Employees With Insomnia		Employees Without Insomnia		Difference ^a
	n	Adjusted Mean Days	n	Adjusted Mean Days	
Sick Leave	5,582	4.42	136,661	2.05	2.37
Short-term Disability	6,774	4.07	130,792	2.14	1.93
Long-term Disability	10,107	0.72	195,323	0.17	0.55
Workers' Compensation	11,669	0.52	258,274	0.36	0.15
Total		9.73		4.72	5.01

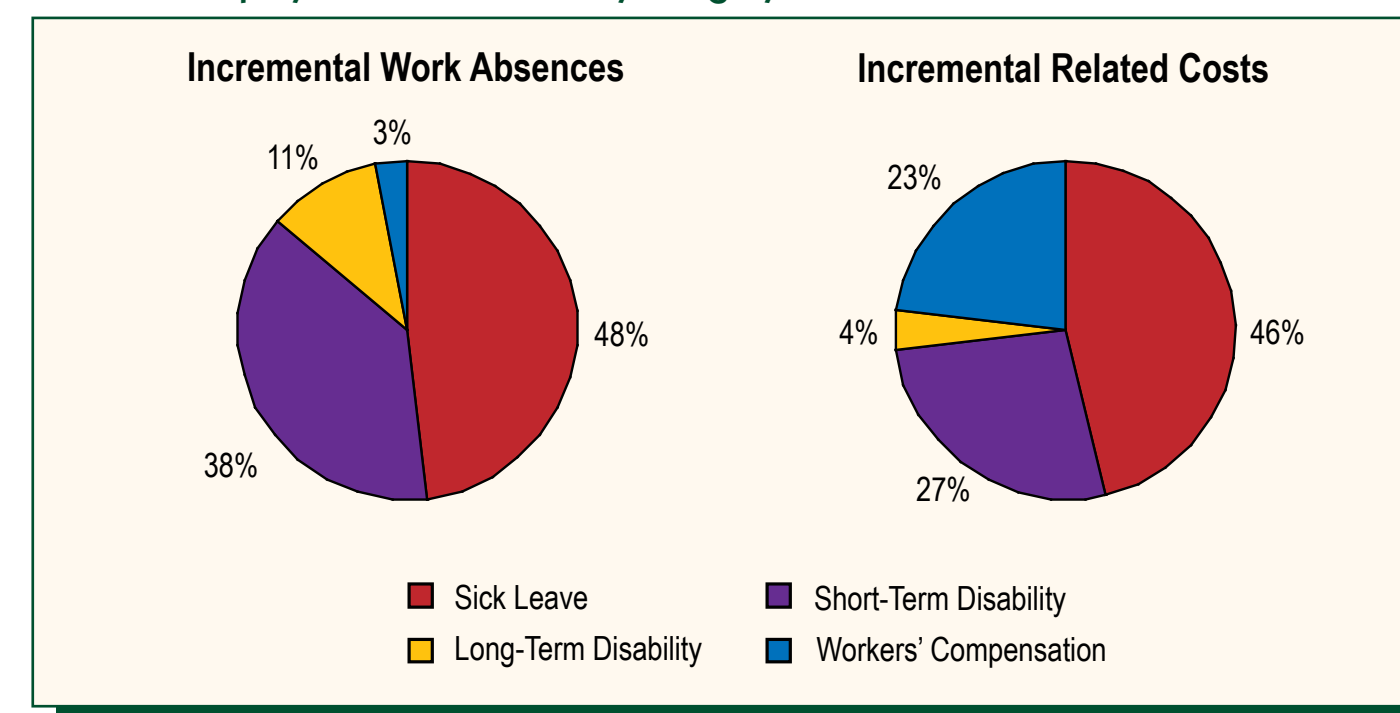
^aNumbers have been rounded.
 All results are per employee.
 Differences between insomnia and control group were highly significant for every category ($P < 0.003$).

Table 3. Comparison of Annual Absence Costs Between Employees With and Without Insomnia

Absence Category	Employees With Insomnia		Employees Without Insomnia		Difference ^a
	n	Adjusted Mean Cost	n	Adjusted Mean Cost	
Sick Leave	5,582	\$720	136,661	\$325	\$395
Short-term Disability	6,774	\$465	130,792	\$229	\$236
Long-term Disability	10,107	\$46	195,323	\$10	\$35
Workers' Compensation	11,669	\$483	258,274	\$280	\$203
Total		\$1,714		\$844	\$869

^aNumbers have been rounded.
 All results are per employee.
 Differences between insomnia and control group were highly significant for every category ($P < 0.0001$).

Figure 1. Breakdown of Incremental Work Absences and Incremental Related Costs of Employees With Insomnia by Category



CONCLUSIONS

- Employees with insomnia incurred significantly more work absences per year with an associated increase in health-related lost time benefit costs.
- Absences due to sick leave accounted for almost half of the incremental health-related lost time benefit costs and almost half of the incremental lost time.
- These results did not include the costs of replacement workers or lost productivity due to these absences.
- These results highlight the substantial costs of insomnia to employers, in the form of lost work days and high benefit costs, and demonstrate the need for improved disease management.

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