Use of Pharmacologic Sleep Aids and Stimulants Among Emergency Medicine Staff Physicians in a Canadian Tertiary Care Setting: A Web-Based Survey

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Study objective: Emergency medicine by its nature requires shift work that follows an erratic and unpredictable pattern. Faced with this challenge, we hypothesize that many emergency physicians have taken steps to minimize their personal sleep deprivation through the use of pharmacologic sleep aids. The extent and nature of pharmacologic sleep aid use in this population is not well studied. We seek to describe the use of pharmacologic sleep aids among practicing emergency physicians in a Canadian tertiary care setting.

Methods: A cross-sectional descriptive Web-based survey was sent by e-mail to all practicing staff emergency physicians within the Calgary zone of Alberta Health Services. Descriptive statistics were used to assess frequencies and explore associations between selected variables.

Results: Of the 198 eligible emergency physicians, 144 (73%) completed the survey. Ninety-six emergency physicians (67%; 95% confidence interval [CI] 59% to 74%) had used a pharmacologic sleep aid at some time in their career, and 81 (56%; 95% CI 48% to 64%) were currently using one with any frequency. The most frequent sleep aids being used by physician respondents were nonbenzodiazepine hypnotics (38%), alcohol (17%), and melatonin (15%). Sixty-five respondents (45%; 95% CI 37% to 53%) required a prescription for their pharmacologic sleep aid and 38 (58%; 95% CI 46% to 70%) of those had obtained a prescription from an emergency physician colleague. None of the physicians believed that their use of pharmacologic sleep aids adversely affected their ability to provide quality patient care.

Conclusion: Pharmacologic sleep aid use among Canadian emergency physicians may be more common than previously assumed. This could have implications for physician well-being and performance. [Ann Emerg Med. 2019;73:325-329.]

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INTRODUCTION

Background

Emergency medicine by its very nature requires shift work. Most emergency physicians must work some combination of day, evening, and night shifts. These shifts often follow an erratic and unpredictable pattern.

We hypothesize that, faced with these ongoing challenges, many emergency physicians will have taken steps to minimize their personal sleep deprivation through the use of a pharmacologic sleep aid. We defined pharmacologic sleep aids as any pharmacologic intervention prescription or nonprescription used alone or in combination for the sole purpose of obtaining sleep. There is limited research examining pharmacologic sleep aid use among emergency physicians. Available research is limited by poor response rates.[1-3] The goal of this study was to determine the prevalence and type of pharmacologic sleep aid use by tertiary care emergency department (ED) staff physicians in an urban Canadian center. Awareness of these data may aid in future physician education or interventions.

MATERIALS AND METHODS

We conducted a descriptive Web-based anonymous survey with a cross-sectional survey design. The study and the survey instrument had approval from our local conjoint health research ethics board.

Selection of Participants

All practicing adult and pediatric emergency physicians who worked at any of the 5 ED sites within the Calgary

Editor's Capsule Summary

What is already known on this topic

Emergency physicians often work shifts that conflict with a traditional sleep schedule.

What question this study addressed

To what extent do emergency physicians use pharmacologic sleep aids and what are their patterns of use?

What this study adds to our knowledge

In this survey of 198 emergency physicians in the Calgary, Canada, region, 67% had used pharmacologic sleep aids and 56% were currently using them. Non-benzodiazepine hypnotics predominated.

How this is relevant to clinical practice

This is an important, understudied issue for emergency physician wellness. Its findings should be confirmed in other geographic regions and should lead to further study of whether sleep aid use contributes to other health problems.

zone of Alberta Health Services were eligible for inclusion. Alberta Health Services is a province wide, fully integrated health system responsible for delivering health services to greater than 4 million people living in Alberta, Canada. The Calgary zone of Alberta Health Services is responsible for all emergency medical care provided within the city of Calgary, a population of greater than 1.2 million people. Resident physicians and fellows did not form part of our target population because we thought their working hours did not represent those of a staff emergency physician.

The survey was designed with the input of a local physician who is certified in sleep medicine with the American Board of Sleep Medicine. The survey was developed by our research team and incorporated aspects from previously published surveys assessing sleep aid use among emergency clinicians.[1,3] Our survey instrument was piloted with a selected group of emergency physician members of our research council who were not coinvestigators on this research. The survey is available in Appendix E1, available online at http://www.annemergmed.com.

Data Collection and Processing

The data were collected by means of a standardized Web-based questionnaire that was e-mailed to all practicing emergency physicians working within the Calgary zone. The questionnaire was strictly anonymous and participation was voluntary. Consent was implied by completion of the survey. Physicians were able to complete the survey only once. Data were stored in password-protected electronic files on secure, firewall-protected network drives that were accessible only by the study investigators. No personal identifiers were available and each response was numbered for future analysis.

Our primary variables of interest were the proportions of physicians who are currently using pharmacologic sleep aids or have used them in the past. We sought to determine which pharmacologic sleep aids are being used, and with what frequency.

Our secondary variables of interest were sociodemographic information (age, sex, and living situation), practice characteristics (years in practice and number of night shifts worked), personal sleep characteristics or challenges (history of insomnia and barriers to sleep), and use of stimulants to combat fatigue during shifts.

Primary Data Analysis

Data analysis was descriptive, with means and SDs for continuous variables and percentages and frequencies for categorical variables. Stata/IC for Mac was used for data analysis (version 14.1; StataCorp, College Station, TX).

RESULTS

Of the 198 eligible emergency physicians, 144 (73%) completed the survey. The demographics can be found in Table 1. The majority of our emergency physicians were men (65%) aged 30 to 60 years. Sixty-eight percent of the physicians had less than 15 years of experience working in the ED. Most of the physicians (69%) were currently living with a partner and children at home.

Of the respondents, 132 (92%; 95% confidence interval [CI] 86% to 95%) believed that shift work negatively affected their ability to sleep effectively. Factors contributing to difficulty initiating or maintaining sleep are shown in Table 1. The majority of physicians (84%; 95% CI 77% to 89%) self-reported insomnia at some point in their medical career and 35 (25%; 95% CI 18% to 32%) self-reported chronic insomnia.

Ninety-six respondents (67%; 95% CI 59% to 74%) had previously used a pharmacologic sleep aid to assist them with obtaining sleep, and 81 physicians (56%; 95% CI 48% to 64%) were currently using a pharmacologic sleep aid with any frequency. The most commonly used pharmacologic sleep aids are demonstrated in Table 2. Nonbenzodiazepine hypnotics were the most popular, with 72 respondents (50%; 95% CI 42% to 58%) having used one for sleep previously and 54 (38%; 95% CI 30% to 46%) currently using one with any frequency. Other common pharmacologic sleep aids

Table 1. Demographic variables and characteristics of emergency physicians who completed the survey.

Characteristic	Emergency Physicians, No. (%) (95% CI)
Sex	
Male	93 (65) (57–72)
Age, y	
20–29	1 (1) (0–4)
30–39	61 (42) (35–51)
40–49	44 (31) (24–39)
50–59	31 (22) (16–29)
60–69	6 (4) (2–9)
≥70	1 (1) (0–4)
Living situation	
Live alone	18 (13) (8–19)
Live with partner only	27 (19) (13–26)
Live with partner and children	99 (69) (61–76)
Single with children	0
No. of years working in ED post-residency	
<5	34 (24) (17–31)
5–10	43 (30) (23–38)
11–15	21 (15) (10–21)
16–20	14 (10) (6–16)
21–25	14 (10) (6–16)
26–30	11 (8) (4–13)
>30	7 (5) (2–10)
No. of night shifts worked in an average month	
None	6 (4) (2–9)
1–3	31 (22) (16–29)
3–5	51 (35) (28–44)
5–7	39 (27) (21–35)
>7	17 (12) (8–18)
Factors that contribute to difficulty initiating or maintaining sleep	
Work hours/demands of work	100 (69) (62–76)
Work-related emotional stress	76 (53) (45–61)
Personal or family-related stressors	64 (44) (37–53)
Family commitments	76 (53) (45–61)
Circadian misalignment	128 (89) (83–93)
Other	20 (14) (9–21)
Ever experienced insomnia	
Yes	121 (84) (77–89)
Experience chronic insomnia	
Yes	35 (24) (18–32)

currently being used were alcohol, at (17%; 95% CI 12% to 24%) and melatonin (15%; 95% CI 10% to 22%) Twenty-eight physicians (19%; 95% CI 13% to 27%) were currently using more than one type of pharmacologic sleep aid. None of the physician group reported currently using marijuana, barbiturates, or analgesics for sleep.

Table 2. Pharmacologic sleep aids most commonly used by emergency physicians.

Pharmacologic Sleep Aids	Emergency Physician Use Ever, No. (%) (95% CI)	Emergency Physician Use Currently, No. (%) (95% CI)
None	48 (33) (26–41)	63 (44) (36-52)
Nonbenzodiazepine hypnotics	72 (50) (42–58)	54 (38) (30–46)
Alcohol	35 (24) (18–32)	25 (17) (12–24)
Melatonin	37 (26) (19–33)	22 (15) (10–22)
Antihistamines	32 (22) (16–30)	13 (9) (5–15)
Benzodiazepines	14 (9) (6–16)	6 (4) (2–9)
Herbal medications	11 (8) (4–13)	6 (4) (2–9)
Muscle relaxants	2 (1) (0–1)	1 (1) (0–4)
Analgesics	2 (1) (0–1)	0
Marijuana	2 (1) (0–1)	0
Barbiturates	0	0

Frequency data are shown in Table E1 (available online at http://www.annemergmed.com), which demonstrates that 15% (95% CI 10% to 21%) of physicians self-reported using a pharmacologic sleep aid frequently (defined as >6 times a month).

The most frequent reasons reported for taking a pharmacologic sleep aid were sleeping after a night shift (43 [51%; 95% CI 41% to 62%]) and sleeping before one (40 [47%; 95% CI 37% to 58%]). Twelve emergency physicians (14%; 95% CI 8% to 23%) currently using a pharmacologic sleep aid reported using it for most of their sleep regardless of shifts worked. Sixty-five respondents (45%; 95% CI 37% to 53%) indicated that they required a prescription to obtain their sleep aid. Of those respondents, 27 (42%; 95% CI 30% to 54%) used their family physician or a sleep specialist exclusively for this prescription and 38 (58%; 95% CI 46% to 70%) indicated that they had obtained a prescription from a colleague.

When we examined stimulant use among the emergency physician group, only 19 (13%; 95% CI 9% to 20%) respondents had never used any stimulants during their career. Coffee was the most frequently used stimulant, with 116 respondents (81%; 95% CI 73% to 86%) currently using it on shift, followed by energy drinks (14 [10%; 95% CI 6% to 16%]). Infrequent stimulants included amphetamines, modafinil, ephedrine, and nicotine, all of which had 1 (<1%; 95% CI 0% to 4%) physician reporting their use currently.

Results of subgroup analysis are demonstrated in Table 3. We found that female emergency physicians had a higher rate of pharmacologic sleep aid use, at 69% (95% CI 54% to 80%). There was no meaningful difference in the

Table 3. Subgroup analysis of prespecified variables and their relationship to current use of any pharmacologic sleep aids.

Variable	Physicians Currently Using a PSA, No. (%)	95% CI, %
Sex		
Women	35/51 (69)	54–80
Men	46/93 (50)	40–60
Age, y		
20–29	1/1 (100)	21–100
30–39	32/61 (52)	40–65
40–49	27/44 (61)	47–74
50–59	18/31 (58)	41–74
60–69	3/6 (50)	19–81
>70	0/1	0–79
Night shifts worked/mo		
None	2/6 (33)	10–70
1–3	16/31 (52)	35–68
3–5	31/51 (61)	48–73
5–7	20/39 (51)	36–66
>7	12/17 (71)	47–87
Living situation		
Living with partner	13/27 (48)	31–66
Living alone	9/18 (50)	29–71
Partner + children	59/99 (60)	50–69
Career duration, y		
<5	18/34 (53)	37–69
5–10	24/43 (56)	41–70
11–15	15/21 (71)	50–86
16–20	9/14 (64)	39–84
21–25	7/14 (50)	27–73
26–30	6/11 (55)	28–79
>30	2/7 (29)	8–64
Insomnia history		
None	6/23 (26)	12–47
Insomnia ever	75/121 (62)	53–70
Chronic insomnia	25/35 (71)	54–84
Stimulant use on shift		
None	8/27 (30)	16–49
Caffeine	72/116 (62)	53–70
Other stimulants*	14/17 (82)	59–94

PSA, pharmacologic sleep aid.
*Other stimulants included energy drinks, modafinil, nicotine, and herbals.

rates of pharmacologic sleep aid use when the different age groups or career duration were compared. There appeared to be a greater rate of pharmacologic sleep aid use with increasing night shifts. Emergency physicians who lived alone, with a partner, or with a partner and children all had similar frequency of pharmacologic sleep aid use.

There was strong association between self-reported history of insomnia and use of pharmacologic sleep aids. For emergency physicians who reported ever having insomnia, 75 of 121 (62%; 95% CI 53% to 70%) were currently using a pharmacologic sleep aid, and for emergency physicians who reported chronic insomnia, the rate of pharmacologic sleep aid use was 25 of 35 (71%; 95% CI 54% to 84%). Emergency physicians who self-reported drinking coffee or taking other forms of caffeine on shift were more likely to be users of pharmacologic sleep aids. Likewise, physicians who self-reported use of other stimulants (energy drinks, modafinil, nicotine, or herbals) had very high rates of pharmacologic sleep aid use.

Use of nonbenzodiazepine hypnotics was so prevalent in our population that we decided to look specifically at this subgroup of pharmacologic sleep aids. This analysis can be found in Table E2 (available online at http://www.annemergmed.com).

LIMITATIONS

Despite our strong response rate of 73%, there remains a potential for nonresponse bias. We are unable to know whether nonresponders were more or less likely to be users of pharmacologic sleep aids. Although every effort was made to assure respondents of strict confidentiality, it is possible that some physicians were reluctant to disclose the true nature of their use of pharmacologic sleep aids. Social desirability bias may have led physicians to decline participation or be less than entirely honest in their responses.

We did not perform reliability and validity testing of the survey instrument that we used, which limits the robustness of our results. To our knowledge, there does not exist a standardized and tested survey tool to assess sleep and sleep aid use by physicians specifically. This makes comparisons with other validated instruments or population-level statistics challenging.

The survey's reliance on retrospective reporting could have introduced an element of recall bias, with physicians inadvertently over- or under representing their pharmacologic sleep aid use and frequency.

Finally, the local nature or our survey assisted with our high response rate, but may limit the generalizability of these data to emergency physicians working in other centers in North America or the rest of the world.

DISCUSSION

A review of the literature in this area reveals minimal data specifically examining pharmacologic sleep aid use by staff emergency physicians. The data that are available are focused on emergency medicine residents and suffer from

universally poor response rates (16%, 47%, and 50%, respectively), making it difficult to draw firm conclusions.[1-3]

Our self-reported rate of current (56%; 95% CI 48% to 64%) and previous (67%; 95% CI 59% to 74%) pharmacologic sleep aid use was high. Bailey and Alexandrov[2] surveyed Canadian emergency physicians across Canada in 2005 and demonstrated that only 34% of their respondents had used a pharmacologic sleep aid in their career. Likewise, previous studies examining the use of sleep aids among emergency medicine residents demonstrated lower frequency of use, at 36% and 56%, respectively.[1,3]

The high frequency of nonbenzodiazepine hypnotic medications was a unique finding, which has not been previously demonstrated. Fifty percent (95% CI 42% to 58%) of our respondents had previously used a nonbenzodiazepine hypnotic and 38% (95% CI 30% to 46%) were currently using one. Statistics Canada published 2013 data that showed that the prevalence of prescription sedatives among the general population in Canada was 10.4% and has remained stable since 2008.[4] It would appear that use of this class of medication among emergency physicians is potentially 3 to 4 times higher than that by the general population. A recently published *Journal of the American Medical Association* clinical evidence synopsis examined 15 randomized clinical trials of pharmacologic interventions for sleepiness and sleep disturbances caused by shift work.[5] The study demonstrated a lack of published literature showing that hypnotics were associated with improved sleep outcomes compared with placebo.

There was not a single physician respondent who thought that his or her current use of pharmacologic sleep aids adversely affected the ability to provide quality patient care.

Our response rate of 73% should contribute to our understanding of the true incidence of pharmacologic sleep aid use in this population. We are optimistic that shedding light on this sensitive topic may allow open dialogue and perhaps education in the emergency medicine community.

The use of pharmacologic sleep aids by ED staff physicians in our Canadian tertiary care setting is high. The effect of this on physician well-being, physician performance, and ED patient care are unknown and warrant further investigation.

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