

ORIGINAL REPORT

Patient-reported factors associated with the desire to continue taking sleep-inducing drugs after hospital discharge: A survey of older adults

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Abstract

Purpose: To find out whether any prior experiences with sleep-inducing drugs before hospitalization and positive experiences with these drugs during hospitalization influence a patient's wish to continue taking sleep-inducing drugs after hospitalization.

Methods: We surveyed older hospital patients about use of sleep-inducing drugs before, during, and after hospitalization and compared these answers with their hospital chart using the kappa statistic. The association between the wish to continue these drugs after discharge and the perceived benefits, experience of side effects, and prior experience with sleep-inducing drugs was determined by multivariable logistic regression.

Results: Agreement between patient responses and the hospital file was high ($\kappa = 0.7$). Seventeen percent (83/483) of the participants reported prior experience before their hospital stay; 45% received a sleep-inducing drug during hospitalization; 17% wished to continue taking them after discharge. Of the 400 patients who had no prior experience with sleep-inducing drugs, 147 (37%) became first-time users in the hospital, and 27% (40/147) of these wished to continue this medication after discharged. Strong predictors for this wish were the reduction of sleep onset problems (adjusted odds ratio, 6.26; 95% confidence interval, 2.38-16.44) and any prior experience with sleep-inducing drugs (4.08; 1.97-8.48).

Conclusions: Many older patients become first-time users of sleep-inducing drugs in the hospital. Especially the experience of sleep onset improvements influences the wish to continue sleep-inducing drug use after discharge. Avoiding first-time use should become a goal of hospital policy and be taken into account when weighing the benefits and risks of sleep-inducing drugs.

Stephanie Heinemann and Freya Neukirchen contributed equally to this work.

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KEYWORDS

aged, drug utilization, hospitals, hypnotics and sedatives, pharmacoepidemiology, sleep initiation and maintenance disorders, surveys and questionnaires

1 | INTRODUCTION

Hospitalization significantly affects patients' sleep, both in duration and quality of sleep.¹ Reasons for poorer sleep in the hospital include noise of other patients, medical devices, pain, and toilet visits.¹ Interventions to address such sleep problems during a hospital stay often include the prescription of hypnotic and sedative drugs, especially benzodiazepines and Z-drugs.^{2,3}

These drugs have been shown to improve sleep quality, increase sleep time, and decrease the number of nighttime awakenings. However, there are several potential risks, especially for older patients, such as falls, cognitive impairment, depressive symptoms, and addiction.⁴⁻⁷ In Germany, it is estimated that 1.2 to 1.5 million of its 82 million citizens are dependent upon tranquilizers and sleep-inducing drugs, especially older people.⁸ A review based on epidemiological research⁹ found an overwhelming degree of evidence that benzodiazepines and Z-drugs cause fatal and nonfatal motor vehicle accidents, fractures, and cognitive dysfunction and, at least, weak evidence that these drugs cause dementia. And even if clinical doubt persists regarding the new safety accusations, such as dementia, pancreatitis, or cancer,⁹ the use of these drugs, especially in older persons, needs particular caution. Glass et al⁴ and Treves et al¹⁰ come to the same conclusion, namely, that for persons over 60, the benefits of sedatives and hypnotics may not justify the increased risk.

In spite of these risks and recommendations, more than 40% of older patients receive sleep-inducing drugs during their hospital stay.^{2,11,12} We know some of the reasons for this prescribing behavior: for example, professional knowledge deficits,^{13,14} a perceived lack of alternative treatment options for sleep problems,¹⁵ and the "magic bullet" potential of benzodiazepines and Z-drugs to help patients "feel better overall."¹⁶ Physicians may also regard other medical issues with higher priority than the control and restriction of sleep-inducing drugs.¹⁷

Another important factor for the high use of sleep-inducing drugs in hospitals may be the patients themselves.¹⁸ Although this factor is not well studied, it can be expected that patients who have had previous positive experiences with sleep-inducing drugs wish to receive such drugs when sleep problems reoccur. In interviews, hospital doctors report that patients frequently experience difficulties sleeping in an unfamiliar environment with strange noises and request sleep-inducing drugs.¹⁷ If patients request and use these drugs during hospitalization to deal with sleep problems, a positive experience in the hospital with these drugs may be a reason why patients wish to continue them after discharge.

The aim of this pharmacoepidemiological study was to explore how often older patients use sleep-inducing drugs in the hospital while taking their previous drug experiences into account. Also, the

study aims to explore the consequences of this inpatient drug use after discharge from a patient perspective. We hypothesized that prior experience with these drugs before hospitalization may influence older patients' drug use during hospitalization. We also hypothesized that positive experiences during hospitalization may trigger the wish to continue this use after hospitalization.

2 | METHODS

2.1 | Design

The focus of this study is older patients (65 y and older) who experience nonchronic (transient) sleep problems during their hospital stay. This cross-sectional study was based on a patient survey about the use of sleep-inducing drugs in the hospital and a hospital chart review of the prescribed substances for each surveyed participant. The prescribed sleep-inducing medication classes in this study encompassed the standard medications prescribed for sleep in the hospital studied: benzodiazepines, Z-Drugs, mirtazapine, and baldran.

2.2 | Context

The study is part of a larger project on the prescription of hypnotics and sedatives in primary care and during hospitalization. The ultimate goal of this project is to develop, implement, and evaluate strategies to reduce the use of hypnotics and sedatives.¹⁹

2.3 | Setting

The study took place in a regional hospital for basic and standard care in a mid-sized city in Lower Saxony. The 485 bed hospital has departments of internal medicine, geriatrics (acute and rehabilitation), trauma surgery/orthopedics, general surgery, plastic surgery, urology, and oto-rhino-laryngology. It should be noted that this hospital has no specialized departments for sleep medicine or psychiatry. Therefore, sleep disorders were not the main indication for a treatment episode in this hospital.

2.4 | Sample size

Our first hypothesis—prior experiences with the sleep-inducing drugs before hospitalization may influence older patients' drug use during hospitalization and subsequently also after hospital discharge—was the basis for a rough estimate of the number of patients needed. We estimated that a high percentage (about 70%) of those who had previous experience received a sleep-inducing drug in the hospital,

compared with those who had no previous experience. A total sample of 2×91 patients would be necessary to detect a significant difference of 20% between both groups, with a power of 80% and a confidence level of 95%. A chart review performed at this hospital³ showed that 27% of hospitalized patients received one or more psychotropic drugs before hospital admission. Of course, not all psychotropic drugs are prescribed for sleep induction and related problems. On the other hand, hospital records cannot capture the indication of prior use of sleep-inducing drugs, especially for patients who are not currently taking these drugs at the time of admission. Taking this into account, we estimated that about 20% of patients will have prior experience with sleep-inducing drugs, at least from time to time. Therefore, we aimed to recruit 500 patients to have, at least, 100 patients in the “prior experience” group.

2.5 | Study population

The study included patients from all departments in the participating hospital. The inclusion criteria was defined as all older inpatients (65 y or older) who were about to be discharged (1 day before or on the day of their hospital discharge). The exclusion criteria were defined as patients who did not speak German, were disoriented in time and space, and/or were diagnosed with dementia. Patients meeting inclusion criteria were identified by the hospital nursing staff and interviewed by one of two trained interviewers (FN and a study assistant).

We recruited study participants successively until 500 patients were included in the study. Computer-assisted personal interviewing (CAPI) was performed by two interviewers who used tablet computers to read questions and corresponding answer categories to older patients personally and to enter the data into a web-based questionnaire.

2.6 | Survey

The survey was based on an instrument adapted by Siriwardena et al¹⁶ to investigate the use, experience, and perceptions of Z-drug and benzodiazepine hypnotics in the community. We translated, pretested, and adapted this instrument for use with the CAPI methodology in a population of older patients in the hospital setting (see Appendix S1).

Patients were asked several questions about prior, current, and future use of sleep-inducing drugs. First, they were asked whether they had ever taken a sleep-inducing drug before being admitted to the hospital at some time in the past (phase 1). Then, patients were asked whether or not they had received a sleep-inducing drug during this hospital stay and, if so, what benefits and/or side effects of sleep-inducing drugs they had experienced. Since not all patients experienced all symptoms and some patients received multiple medications, we offered an additional category “I don't know” for the benefits of sleep-inducing drugs (phase 2). In the regression analysis, “I don't know” was treated as “no.” A new aggregate variable “side

KEY POINTS

- Hospitalization significantly affects patients' sleep, both in duration and quality of sleep.
- Forty-five percent of all older hospital patients used sleep-inducing drugs during their hospital stay.
- Of the patients who received sleep-inducing drugs in the hospital, 68% were first-time users.
- Nearly 40% of patients who took sleep-inducing drugs in the hospital wished to continue using them after discharge.
- Further studies should expand our knowledge about how the short-term use of sleep-inducing drugs in the hospital influences patient strategies for dealing with sleeping problems at home.

effect” was created for use in the regression analysis. If a patient answered “yes” to any single question about side effects (see Appendix S1, question #7), the aggregate variable “side effect” was also “yes.” Lastly, patients were asked if they wished to continue taking sleep-inducing drugs after their hospital discharge (phase 3). Following the interview, the interviewers consulted the corresponding patient files to record whether or not the patient had received a sleep-inducing drug and, if so, which substance (eg, benzodiazepines, Z-drugs, mirtazapine, or other sleep-inducing drugs; see Appendix S2 for drug details).

2.7 | Data analysis

Differences between patients who have had prior experiences with sleep-inducing drugs and patients without prior experience were tested for significance by the χ^2 test. The association between the wish to continue sleep-inducing drugs after hospitalization and the perceived benefits was analyzed by multivariable logistic regression, controlling for age, gender, department, experience of any side effects, and prior experience with sleep-inducing drugs—with crude and adjusted odds ratios (ORs) and their corresponding 95% confidence intervals (CI) as measures of effect. Agreement between patient responses about receiving sleep-inducing drugs in the hospital and the prescription information from the hospital file (chart review) was determined by Cohen kappa (κ).

To analyze whether the drug(s) received in the hospital had an influence on the wish to continue sleep-inducing drugs at home, we only considered patients that received a sleep-inducing drug according to both the hospital file and the patient survey ($n = 184$). Patients were classified into five groups according to the sleep-inducing drugs they received over the course of the hospital stay: only benzodiazepines, only Z-drugs, only mirtazapine, only plant extracts (such as the

German "baldrian," a popular valerian-hop extract), or a "mix of these 4 groups." It should be noted that type-1 antihistamines, often given to induce sleep in hospital care in other countries, are not commonly used for this purpose in Germany.

3 | RESULTS

3.1 | Recruitment and sample characteristics

Patient recruitment took place from May to September 2014. A total of 957 patients were soon to be discharged during this period. However, 261 patients could not be included because of disorientation in time and space (75%), dementia (13%), and language barriers (6%); 188 patients refused to take part in the study so that 508 patients 65 years and older (59% women) could be surveyed. Their average age was 77.8 years (women) and 76.0 years (men). About half of the surveyed patients were treated in a surgical department (50%), followed by internal medicine (27%) and geriatrics (23%).

For the following analyses, we excluded all patients who were unsure whether or not they had taken sleep-inducing drugs before or during hospitalization, resulting in a valid sample of 483 subjects. Characteristics of these 483 participants in the survey can be found in Table 1.

3.2 | Use of sleep-inducing drugs before and during hospitalization

Seventeen percent (83/483) of the participants reported prior experience with sleep-inducing drugs before their current hospital stay. Of these patients, the majority had prior experience of 1 year or longer (56/83; 67%).

TABLE 1 Characteristics of the study population (N = 483 patients)

Characteristics	N	%
Gender		
Male	198	41.0
Female	285	59.0
Department		
Surgical departments	240	49.7
Internal medicine departments	135	28.0
Geriatric departments	108	22.4
Previous experience with sedatives/hypnotics		
Not at all	400	82.8
Up to 4 wk	9	1.9
Up to 1 y	18	3.7
Longer than 1 y	56	11.6
Age group		
85 y and older	72	14.9
65-84 y	411	85.1

According to the chart review, 20% (96/483) of the respondents had received a benzodiazepine at some point during their hospital stay, 17% baldrian, 12% mirtazapine, and also 12% a Z-drug. A total of 46% (222/483) of the patients had received at least one sleep-inducing drug, 145 (30%) of them received a benzodiazepine or a Z-drug or both.

According to the survey, 45% (217/483) of the older patients received a sleep-inducing drug during their hospital stay, with no differences between men and women. Sleep-inducing drugs were given more often in the geriatric department (55%) than in surgery departments (39%) and departments of internal medicine (47%). Patient survey responses and the information from the hospital files agreed in 84.9% of the cases, resulting in a substantial κ of 0.70.

Of the 217 patients who received a sleep-inducing drug, the vast majority (188/217; 87%) received sleep-inducing drugs multiple times during their hospital stay. A total of 193 patients experienced at least one benefit, most often improvements of sleep onset time (156/217; 72%) and nighttime waking (129/217; 60%); only 2% to 6% of the sample answered "I don't know." A group of 85 patients reported at least one side effect, most often daytime drowsiness (45/217; 21%) and feeling dazed (25/217; 12%).

3.3 | Factors that predicted the wish to continue sleep-inducing drugs after discharge

In total, 82 of 483 (17%) patients wished to take sleep-inducing drugs after discharge. Figure 1 presents the results along the three phases of the study, ie, before, during, and after hospitalization. Of the 83 patients who had previous experience with sleep-inducing drugs (phase 1), 70 (84%) received such a drug in the hospital (phase 2) and 42 (51%) of these patients wished to continue this medication after being discharged (phase 3). Of the 400 patients who had no previous experience (phase 1), 147 (37%) received a sleep-inducing drug for the first time in the hospital (phase 2) and 40 (10%) patients wished to continue this medication after being discharged (phase 3). The difference between patients with and without prior experience with sleep-inducing drugs was highly significant when comparing the rate of drugs received in the hospital (84% vs 37%; $P < .0001$) and the wish to continue the drugs after hospitalization (60% vs 27%; $P < .0001$).

There were several significant predictors for the wish to continue taking sleep-inducing drugs at home (Table 2): two perceived benefits of sleep-inducing drugs, ie, the reduction of sleep onset problems (adjusted OR, 6.26; 95% CI, 2.38-16.44) and lessening of nervousness (2.20; 1.02-4.76) as well as previous experience with sleep-inducing drugs (4.08; 1.97-8.48) and treatment in a nonsurgical department (2.54; 1.24-5.19).

Of those patients who received a sleep-inducing drug according to both the hospital file and the patient survey ($n = 184$), 74 (40%) wished to continue them. In the case of benzodiazepines, it was 17% (10/59), for Z-drugs 45% (9/20), for baldrian 41% (12/29), for

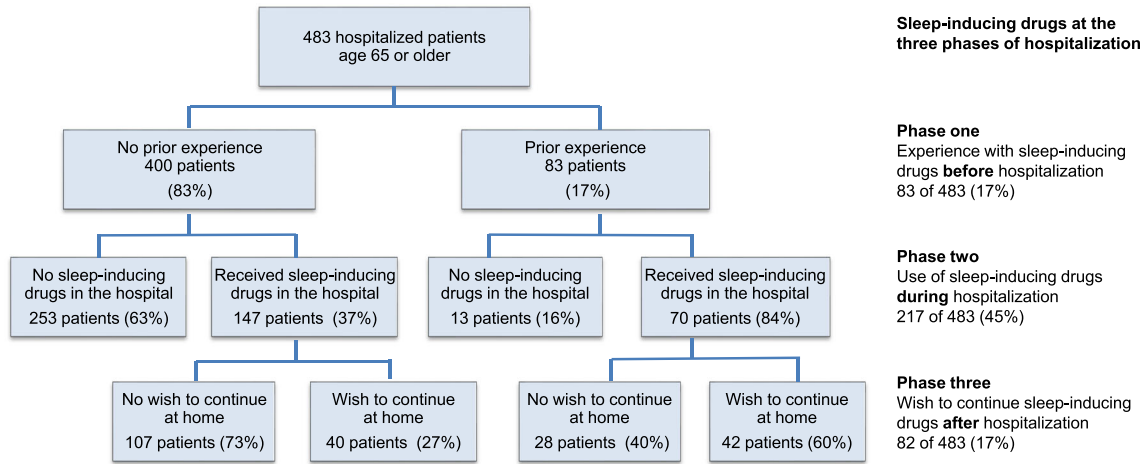


FIGURE 1 Patient-reported use of sleep-inducing drugs before and during hospitalization and the wish to use them after hospitalization [Colour figure can be viewed at wileyonlinelibrary.com]

mirtazapine 70% (16/23), and for a mix of substances from these groups 51% (27/53).

4 | DISCUSSION

4.1 | Summary

Forty-five percent of older hospital patients used sleep-inducing drugs during their hospital stay. The majority of patients who received these drugs in the hospital had no previous experience with sleep-inducing drugs. Of the patients who received sleep-inducing drugs in the hospital, nearly 40% wished to continue using them after discharge. The reduction of sleep onset problems in the hospital most strongly predicted a patient's wish for continued use of sleep-inducing drugs after discharge.

4.2 | Strengths and limitations of the study

To the best of our knowledge, this is the first study that traces the development of the wish to use sleep-inducing drugs as a matter of experiences, first prior to the current hospital stay as a reason to ask for these drugs in the hospital, then in the hospital environment as a predictor for the wish to continue use at home.

The agreement between patient reports about drug use and the hospital files was high, indicating high convergent validity. A further methodological strength of the study lies in the surveying of older patients in the hospital setting using interviewers and a CAPI technique, which lead to complete data collection without missing values.

Limitations include the study design, the study location, and the study sample. First, this is a cross-sectional study so that it is, on principle, impossible to establish a causal relationship between the predictors and our main criterion, ie, the wish to continue sleep-inducing drugs after discharge. For use in a large sample of older patients, the simplicity of yes/no questions in the survey was appropriate. However, such dichotomous data only gives information about the wish to

continue sleep-inducing drugs after discharge and adds no information about why patients wish to (dis)continue these drugs. Second, the survey was conducted in a single hospital, which limits the generalizability of the results. The use of sleep-inducing drugs could vary, according to a hospital's drug policy, size, and specialties. It should be noted that the hospital under study was willing to open its doors and its patient records to our researchers for the explicit purpose of studying sleep-inducing drugs. Therefore, it is possible that the prevalence of the use of sleep-inducing drugs will be even higher in hospitals that would not allow such an in-depth look behind the scenes. Third, all older patients surveyed were able to answer the questions themselves, which excluded, for example, patients with dementia from the sample. Also, we did not record the admission medication or diagnoses of the patients surveyed. Relevant comorbidities such as anxiety, chronic insomnia, and/or depression could have been the reason for the use of psychoactive drugs. However, we know from a chart review of all older patients treated in this hospital that the prevalence of such comorbidities was so low—for example, depression below 6%—that it cannot account for the use of these drugs in 45% of patients.³ A review of admission medication would have allowed us to identify “current users,” ie, those patients who were regularly taking sleep-inducing drugs at the time of hospital admission. Future studies should take these factors (comorbidities and current drug use) into account.

4.3 | Meaning of the study

The study confirmed former results about the high use of sleep-inducing drugs during a hospital stay. According to a study in a Belgian university hospital, more than 40% of patients received a hypnotic drug, mostly but not always as a result of continuation of hypnotics started before admission.¹¹ A more recent Swiss observational study also found a high percentage of patients with sedative drugs at discharge (44%), many of them with a new prescription during hospitalization.² So, the rhetorical question whether anything had changed in the use

TABLE 2 Predictors for the wish to continue taking sleep-inducing drugs after a hospital stay

Predictors	% ^a	Univariate Model			Multivariable Model		
		OR	(95 % CI) ^b	P	OR	(95 % CI) ^b	P
Gender							
Male	31.5	1.00	(0.90-2.81)	.157	1.00	(0.52-2.10)	.905
Female	42.2	1.59			1.04		
Department							
Surgical departments	27.7	1.00	(1.23-3.88)	.003	1.00	(1.24-5.19)	.011
Nonsurgical dept. ^c	45.5	2.19			2.54		
Prior experience with sedatives/hypnotics							
No prior experience	27.2	1.00	(2.20-7.31)	<.001	1.00	(1.97-8.48)	<.001
Prior experience	60.0	4.01			4.08		
Age group							
85 y and older	57.6	1.00	(1.23-5.5)	.005	1.00	(0.82-4.95)	.128
65-84 y	34.2	2.63			2.01		
Side effects							
No side effects	36.4	1.00	(0.67-2.04)	.521	1.00	(0.61-2.44)	.571
At least 1 side effect	40.0	1.17			1.22		
Problems with sleep onset time							
No improvement	13.1	1.00	(2.67-13.40)	<.001	1.00	(2.38-16.44)	<.001
Improvement	47.4	5.98			6.26		
Problems with nighttime waking							
No improvement	29.5	1.00	(1.02-3.25)	.058	1.00	(0.43-1.95)	.822
Improvement	43.4	1.83			0.92		
Problems with pain							
No improvement	33.3	1.00	(1.22-4.61)	.007	1.00	(0.69-3.65)	.280
Improvement	54.4	2.38			1.59		
Problems with nervousness							
No improvement	30.7	1.00	(1.28-3.99)	.008	1.00	(1.02-4.76)	.045
Improvement	50.0	2.26			2.20		
Problems with anxiety							
No improvement	33.3	1.00	(1.22-4.61)	.027	1.00	(0.44-2.65)	.869
Improvement	54.4	2.38			1.08		
Tolerance of hospital environment							
No improvement	29.6	1.00	(1.22-3.74)	.013	1.00	(0.72-2.99)	.297
Improvement	47.5	2.14			1.46		

Note. Numbers in bold are significant at $P < .05$.

^aPercentage of patients who wish to continue taking sleep-inducing drugs after their hospital stay.

^bOR = odds ratio; 95 % CI = 95 % confidence interval.

^c"Nonsurgical departments" include departments of internal medicine and geriatrics (acute and rehabilitative).

of hypnotic drugs during the last decade¹¹ still remains important.

Our study adds to the present state of knowledge in four respects:

1. The role of prior experience

The fact that especially those patients in our study received sleep-inducing drugs that had already experienced sleep-inducing drugs

before their current hospital stay indicates that prior experience is an important factor for the wish to use sleep-inducing drugs when sleep problems arise. This patient-based factor is a warning not to blame nurses and hospital physicians alone for a too liberal use of these drugs. An interview study reported that hospital doctors felt pressured by patients who demanded hypnotics or sedatives because of the unfamiliar surroundings and strange noises

in the hospital, ie, transient insomnia.¹⁷

2. Sleep onset improvement as the main factor

The hospital environment poses many challenges to patients wishing to sleep, including unfamiliar sounds, smells, lighting, bedding, etc, as well as a situation where nurses may enter the room during the night to perform nursing care duties.²⁰ A quarter of a century ago, a study in an Australian public hospital found that 52% of the patients received a benzodiazepine—mainly due to sleep problems—whereby patients usually reported an improvement in falling asleep, not in the overall quality of sleep.¹² The results of our study confirmed that it is the positive experience of falling asleep soon after taking the drug—but not an improvement in nighttime waking—that patients appreciate. This experience, be it a pharmacological or placebo effect, proved to be a strong factor for the wish to repeat these experiences in other environments.

3. First-time use in the hospital

According to a study from Israel,²¹ older first-time users were almost five times more likely to use sleep medicines in the months after discharge, compared with those that did not receive these medicines in the hospital. To learn more about this knock-on effect of the hospital, we asked patients who received sleep-inducing drugs in the hospital whether or not they wished to continue taking these drugs at home. A considerable proportion of these patients wished to continue the sleep-inducing drugs after discharge. So, while Zisberg et al's²¹ study shows that first-time use of sleep-inducing drugs in the hospital often results in a use of these drugs directly after the hospital stay at home; our study shows the willingness to use these drugs whenever sleep problems arise. Both studies show first-time use of sleep-inducing drugs in the hospital can carry over to the private setting, even if drug management across health care sectors and the role of general practitioners in the prescription and restriction of sleep-inducing drugs differ in both countries. In Germany, for example, p.r.n. drugs—such as sleep-inducing drugs—are often not listed in the recommended medications in the hospital discharge letter. In addition, patients are normally discharged from the hospital with drugs for max. 1 to 3 days and must contact their general practitioner for necessary prescription medication.

Although not every sleep-inducing drug administered and taken in the hospital is the first step into a history of drug abuse or dependency, large studies with insurance claims data in Canada²² and Germany²³ have shown that about 1% of patients who were admitted to the hospital with no recent hypnotic prescriptions received a benzodiazepine or Z-drug over a longer period following a hospital stay. While a rate of 1% looks unimpressive for those unfamiliar with pharmacoepidemiological data processing, our study may raise awareness among hospital nurses and doctors since it is, indeed, a large group of persons who continue using sleep-inducing drugs after hospitalization.

4. Mirtazapine as a sleep-inducing drug

Interestingly, the antidepressant mirtazapine was the sleep-inducing drug that the highest percentage of older patients in our study wanted to continue using at home. So far, mirtazapine has

not played a major role in other hospital-based “sleep” studies. Mirtazapine is appreciated for its fast-acting, positive impact upon sleep latency and sleep quality, whereby weight gain can be a common sequela.²⁴ Although the patients who received mirtazapine in our study reported that they received a “sleep-inducing drug,” we do not know whether these patients were also being treated for depression symptoms. Further research will need to closely examine a strategy of initiating mirtazapine for transient sleep problems in the hospital setting and the potential long-term effects (both benefits and risks) of mirtazapine use to treat sleep problems for nondepressed elderly living at home.

4.4 | Implications of the study

Assuming that most older patients experience nonsevere sleep problems in the hospital, there is little indication for the widespread prescription of sleep-inducing drugs.²⁵ Therefore, doctors and nurses in the hospital setting should take older patients' sleep problems seriously, but respond conservatively, especially when sleep onset problems are communicated. Discussions at the time of hospital admission may present a good window of opportunity to inform patients that sleep onset problems are a normal occurrence in the hospital. Such discussions may be used to proactively curb patients' demands for sleep-inducing drugs.

Since our study shows that many patients become first-time users in the hospital setting, further studies should expand our knowledge about how (if at all) the first-time use of sleep-inducing drugs in the hospital setting affects patient strategies for dealing with sleeping problems in the private setting after hospital discharge.

Nonpharmacological alternatives such as providing ear plugs and eye masks, changing the light and sound environment, and reducing nursing care activities that disrupt sleep²⁶ as a first line treatment for transient sleep disturbances in the hospital environment can reduce the number of patients who experience sleep-inducing drugs for the first time in the hospital. Whether these strategies can also reduce the number of individuals who become long-term hypnotic drug users in old age and how it is possible to reduce the patient wish to continue sleep-inducing drugs after discharge should be topics for future research.

In conclusion, both previous and current experiences with sleep-inducing drugs significantly contribute to the use of these drugs during hospitalization and the wish to continue taking them after hospitalization. Without condemning every sleep-inducing drug as the first step into dependency, we could show that hospitals promote, at least indirectly, interest in these drugs and the wish to use them also after hospitalization. So, avoiding the first-time use of sleep-inducing drugs should become a goal of a hospital's policy and should be taken into account when weighing the benefits and risks of sleep-inducing drugs.

ETHICS STATEMENT

All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the University Medical Center in Göttingen, Germany (ref number 25/2/14).

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interests. R.N. is head physician of the geriatric department of the Evangelisches Krankenhaus Göttingen-Weende.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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