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# Predicting insomnia in medical wards: the effect of anxiety, depression and admission diagnosis

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**Abstract**

**Objective:** Insomnia is frequently underrecognized in medical wards; therefore, we assessed the prevalence and explored medical and psychological variables associated with insomnia.
**Method:** The Athens Insomnia Scale and the Hospital Anxiety and Depression Scale (HADS) were completed in 235 inpatients along with demographic data, admission diagnosis, lifetime psychiatric diagnosis and prescribed psychotropics.
**Results:** The overall insomnia prevalence was 37%. Logistic regression showed that HADS anxiety and depression cases and patients with infections were more likely to have insomnia (OR 24.2, 6.1 and 5.4, respectively).
**Conclusions:** Patients with depressive and mainly anxiety symptoms are more likely to experience insomnia in medical wards. Patients with infections are also likely to have insomnia, independently of depressive and anxiety symptoms, and appropriate interventions should be applied.


*Keywords:* Sleep Disorders; Psychiatric Status Rating Scales; Athens Insomnia Scale; General Hospital; Infections

## 1. Introduction

Sleep disturbances are frequently under-recognized and few studies have investigated insomnia specifically in medical wards, in contrast to acute and intensive care units [1]. Therefore, this study examined the insomnia prevalence in a medical ward and, to guide liaison psychiatrists, explored the predictive value of admission diagnosis. Given that insomnia was previously suggested as a depression marker [2], the correlation of insomnia to depressive and anxiety symptoms was also investigated.

## 2. Methods

Patients hospitalized in a medical ward for at least 7 days were randomly recruited during the first semester of 2010. They were classified as anxiety/depression noncases, ambiguous or probable cases according to a score of ≤7, 8–10 or ≥11, respectively, in the Greek Hospital Anxiety and Depression Scale (HADS) [3]. Insomnia was assessed using the 8-item Athens Insomnia Scale (AIS), an *ICD-10*-based self-assessment instrument [4]. AIS is appropriate for general hospitals [5] and a score of ≥6 indicates insomnia [6]. Age, gender, admission diagnosis, lifetime psychiatric diagnosis and prescribed psychotropics (antidepressants, antipsychotics, benzodiazepines) were retrieved from patients' medical records. Admission diagnoses were grouped in four clusters: (1) Infections, predominantly respiratory and urinary tract infections; (2) Acute cardiovascular diseases, mainly angina and heart infarction; (3) Chronic cardiovascular diseases, primarily heart failure and (4) Neurological diseases, predominantly strokes and epilepsy. Patients with multiple and/or overlapping somatic diseases were classified to a particular group according to the main reason of admission. A Chronic Disease Score (CDS)

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[7,8], indicating the severity of somatic diseases was calculated for each patient and was used for controlling baseline comorbidity [9]. Following ethics committee's approval and informed written consent, 250 patients participated and 235 fully completed questionnaires, with no missing answers, were finally collected. Results were analyzed using the Pearson's chi-square test and, additionally, binary and ordinal logistic regression were used to explore variables associated with insomnia.

## 3. Results

The overall insomnia prevalence was 37% (Table 1). Analysis showed that insomnia's prevalence significantly differed across admission diagnosis, HADS anxiety and depression cases [$\chi^2$=7.981, *df*=3, *P*=.046; $\chi^2$=60.774, *df*=2, *P*<.001; $\chi^2$=39.2, *df*=2, *P*<.001, respectively].

Although regression did not find a correlation of psychotropic use with insomnia, significant differences were observed in prescribed benzodiazepines across patients with different admission and lifetime psychiatric diagnoses [$\chi^2$=37.836, *df*=3, *P*<.001; $\chi^2$=22.663, *df*=3, *P*<.001, respectively].

Logistic regression (Table 2) showed that the variables that were significantly associated with insomnia were HADS probable (OR=24.210) and ambiguous (OR=6.359) anxiety cases and HADS probable depression cases (OR=6.129). Interestingly, admission diagnosis and, specifically, admission due to infections was also significantly associated with insomnia (OR=5.488). To further test the association of admission diagnosis with insomnia in patients with no suspected psychopathology and ensure that no HADS cases were overrepresented in the infections group, we excluded probable and ambiguous HADS cases. However, infections were still significantly associated with insomnia (OR=5.645).

Logistic regression for each AIS item showed that HADS anxiety cases were likely to score higher on all AIS items. HADS depression cases and patients with infections were likely to score higher only in specific AIS items (Table 3).

## 4. Discussion

In the Greek general population, the AIS-identified insomnia prevalence was 25% [10]. In our sample, it was significantly higher, confirming that admission associates with increased insomnia prevalence. Indeed, ward distractions (noise, lights, etc.) may precipitate insomnia, especially in elderly patients [11]. Limited studies in medical wards identified similar insomnia rates [11–13], and reported variations [2] may be explained by different methodologies and frequencies of psychiatric disorders in patient samples.

The factors that were independently associated with insomnia were the HADS-identified depressive and mainly anxiety symptoms. A single previous study, using the Mini International Neuropsychiatric Interview, showed that insomnia is a marker for depression in medical wards [2]. Our study, using well-validated instruments, highlights the interaction of insomnia particularly with anxiety and to a lesser degree with depressive symptoms.

Table 1
Sample characteristics and prevalence of insomnia

| Group | Subgroup | % of Sample | Age | CDS | HADS | BZD | $\chi^2$ | % with insomnia | $\chi^2$ |
|---|---|---|---|---|---|---|---|---|---|
| All patients | *N*=235 | 100% | 67±14 | 6.0±2.7 | 10±8.6 | 22% | | 37% | |
| Gender | Men | 49% | 65±13 | 6.2±2.7 | 8±7 | 26% | | 34% | |
| | Women | 51% | 68±15 | 5.9±2.7 | 12±9 | 18% | ns | 40% | ns |
| Admission Diagnosis | Neurological | 15% | 70±16 | 5.0±0.4 | 11±1.5 | 5% | | 25% | |
| | Infections | 29% | 63±18 | 4,6±3.4 | 11.5±9.0 | 6% | | 50% | |
| | Acute cardiac | 33% | 68±11 | 7.0±1.8 | 9.5±8.5 | 44% | | 35% | |
| | Chronic cardiac | 23% | 66±11 | 7.2±2.0 | 8.5±8.0 | 22% | *** | 32% | * |
| Lifetime Psychiatric Diagnosis | None | 88% | 66±14 | 6.1±2.6 | 9±8.5 | 18% | | 36% | |
| | Depression | 6% | 68±18 | 4.7±3.4 | 13.5±7.4 | 64% | | 42% | |
| | Organic/dementia | 4% | 78±8 | 5.7±3.1 | 17±9.3 | 20% | | 60% | |
| | Anxiety | 2% | 76±1 | 8.0±1.4 | 11.5±9.4 | 75% | *** | 25% | ns |
| Prescribed Psychotropics | None | 73% | 66±15 | 6.0±2.9 | 9.6±8.7 | 0% | | 36% | |
| | Yes | 27% | 68±12 | 6.0±2.3 | 11±8.4 | 82% | *** | 41% | ns |
| HADS | HADS noncases | 63% | 65±14 | 6.1±2.8 | 4.3±4.2 | 22% | | 20% | |
| | HADS cases | 37% | 68±14 | 6±2.7 | 19.5±5.1 | 22% | ns | 65% | *** |
| HADS Anxiety | No anxiety | 70% | 66±14 | 6.1±2.8 | 5.8±5.7 | 22% | | 21% | |
| | Ambiguous | 18% | 69±15 | 5.9±2.6 | 18±4.5 | 29% | | 64% | |
| | Probable anxiety | 12% | 66±14 | 5.8±2.7 | 22.6±5.7 | 14% | ns | 86% | *** |
| HADS Depression | No depression | 75% | 65±14 | 6.0±2.8 | 6.1±5.7 | 23% | | 26% | |
| | Ambiguous | 7% | 66±15 | 5.4±3.7 | 17.8±3.2 | 25% | | 50% | |
| | Probable depression | 18% | 71±13 | 6.3±1.9 | 23±4.2 | 19% | ns | 76% | *** |

Values represent percentages or mean values±standard deviation (S.D.).
BZD, benzodiazepines.
One, two or three asterisks denote different levels of statistical significance (*P*<.05, *P*<.01 and *P*<.001, respectively).